US009430762B2

(12) **United States Patent**
Imai et al.

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(45) **Date of Patent: Aug. 30, 2016**

(54) **FEE MANAGEMENT SYSTEM, TRANSMISSION SYSTEM, AND FEE MANAGEMENT METHOD**

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(72) Inventors: **Takuya Imai**, Tokyo (JP); **Kenichiro Morita**, Tokyo (JP); **Shoh Nagamine**, Kanagawa (JP)

(73) Assignee: **Ricoh Company, Ltd.**, Tokyo (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 267 days.

(21) Appl. No.: **14/166,126**

(22) Filed: **Jan. 28, 2014**

(65) **Prior Publication Data**

US 2014/0244460 A1 Aug. 28, 2014

(30) **Foreign Application Priority Data**

Feb. 28, 2013 (JP) 2013-038766

(51) **Int. Cl.**
G07F 19/00 (2006.01)
G06Q 20/14 (2012.01)

(52) **U.S. Cl.**
CPC ***G06Q 20/145*** (2013.01)

(58) **Field of Classification Search**
CPC G06Q 20/145
USPC 705/34, 52, 412
See application file for complete search history.

(56) **References Cited**

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2011/0314099 A1 12/2011 Imai et al.

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U.S. Appl. No. 13/989,653, filed Oct. 18, 2012.

* cited by examiner

Primary Examiner — Hunter Wilder
(74) *Attorney, Agent, or Firm* — Oblon, McClelland, Maier & Neustadt, L.L.P.

(57) **ABSTRACT**

A disclosed fee management system is for managing attending fees that are charged when transmission terminals attend a conversation in a transmission management system, which manages transmission of information associated with the conversation between the transmission terminals. The fee management system includes an acquisition unit configured to acquire attending hours information and conversation quality information, the attending hours information indicating attending hours for which the respective transmission terminals have attended the conversation, the conversation quality information indicating conversation communication service quality provided during the conversation; an attending hours computing unit configured to compute total attending hours based on the attending hours information, the total attending hours indicating hours for which the terminal has attended the conversation; and an attending fee computing unit configured to compute an attending fee for each of the terminals based on the corresponding total attending hours and the conversation quality information.

8 Claims, 21 Drawing Sheets

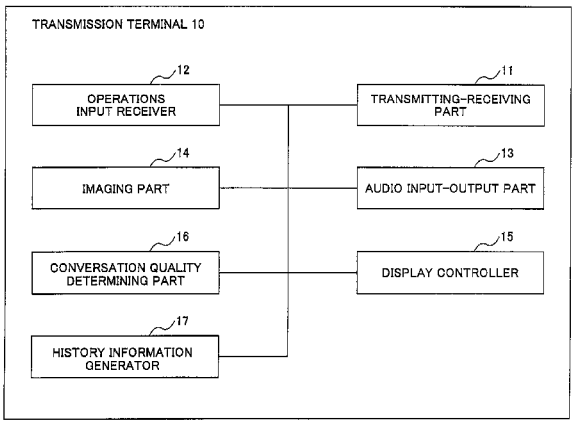


FIG.1

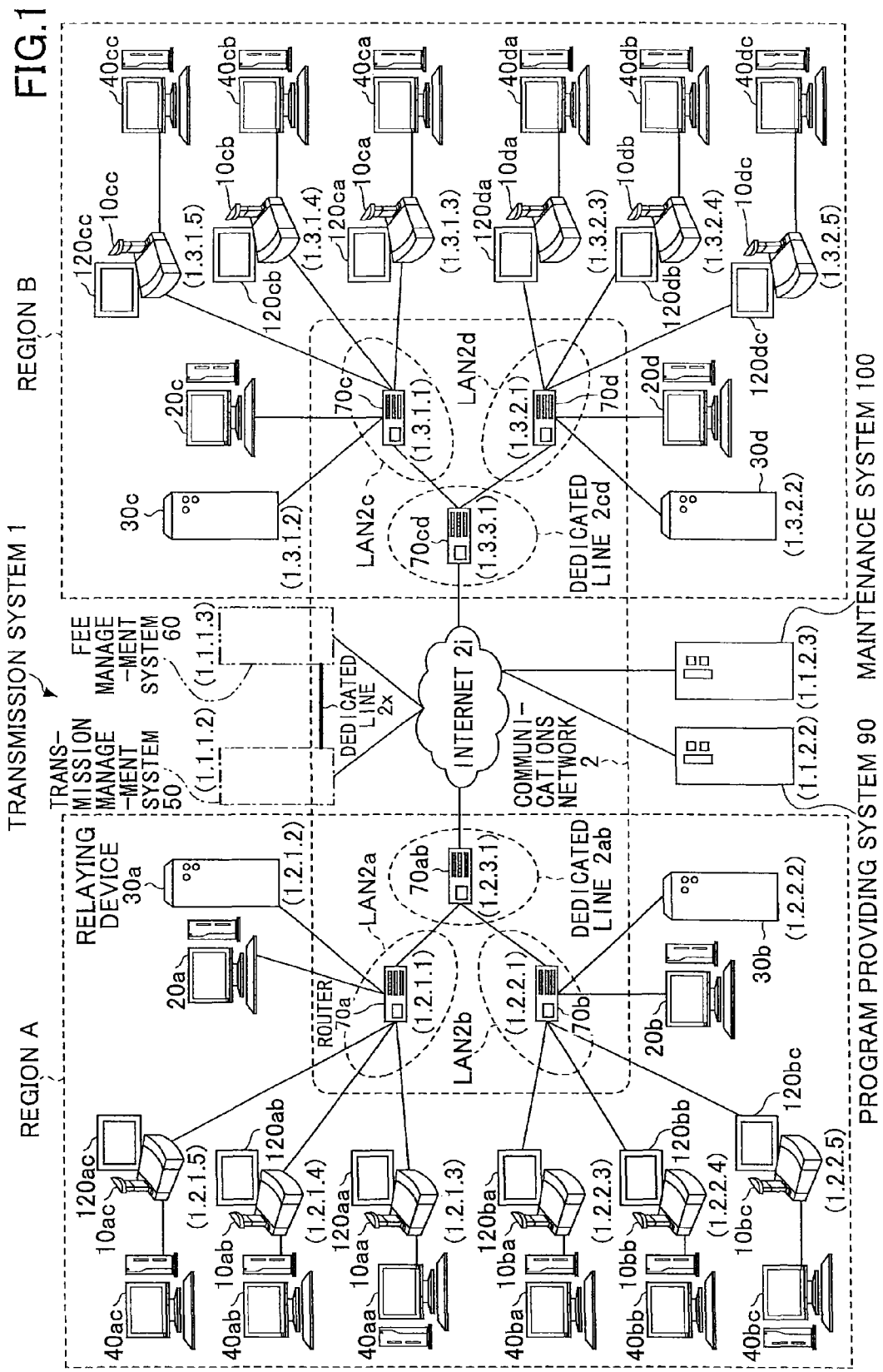

TRANSMISSION SYSTEM 1
REGION A
REGION B
TRANS-MISSION MANAGE-MENT SYSTEM 50
(1.1.1.2)
FEE MANAGE-MENT SYSTEM 60
(1.1.1.3)
DEDICATED LINE 2x
INTERNET 2i
COMMUNI-CATIONS NETWORK 2
(1.1.2.2)
(1.1.2.3)
MAINTENANCE SYSTEM 100
PROGRAM PROVIDING SYSTEM 90
RELAYING DEVICE 30a
(1.2.1.2)
20a
ROUTER 70a
LAN2a
70ab
(1.2.3.1)
DEDICATED LINE 2ab
(1.2.2.2)
30b
20b
LAN2b
(1.2.1.1)
(1.2.2.1)
70b
120ac
10ac
40ac
(1.2.1.5)
120ab
10ab
40ab
(1.2.1.4)
120aa
10aa
40aa
(1.2.1.3)
120ba
10ba
40ba
(1.2.2.3)
120bb
10bb
40bb
(1.2.2.4)
120bc
10bc
40bc
(1.2.2.5)
30c
(1.3.1.2)
20c
70c
(1.3.1.1)
LAN2c
70cd
(1.3.3.1)
DEDICATED LINE 2cd
LAN2d
(1.3.2.1)
70d
20d
30d
(1.3.2.2)
120dc
10dc
40dc
(1.3.2.5)
120cc
10cc
40cc
(1.3.1.5)
120cb
10cb
40cb
(1.3.1.4)
120ca
10ca
40ca
(1.3.1.3)
120da
10da
40da
(1.3.2.3)
120db
10db
40db
(1.3.2.4)

FIG.2

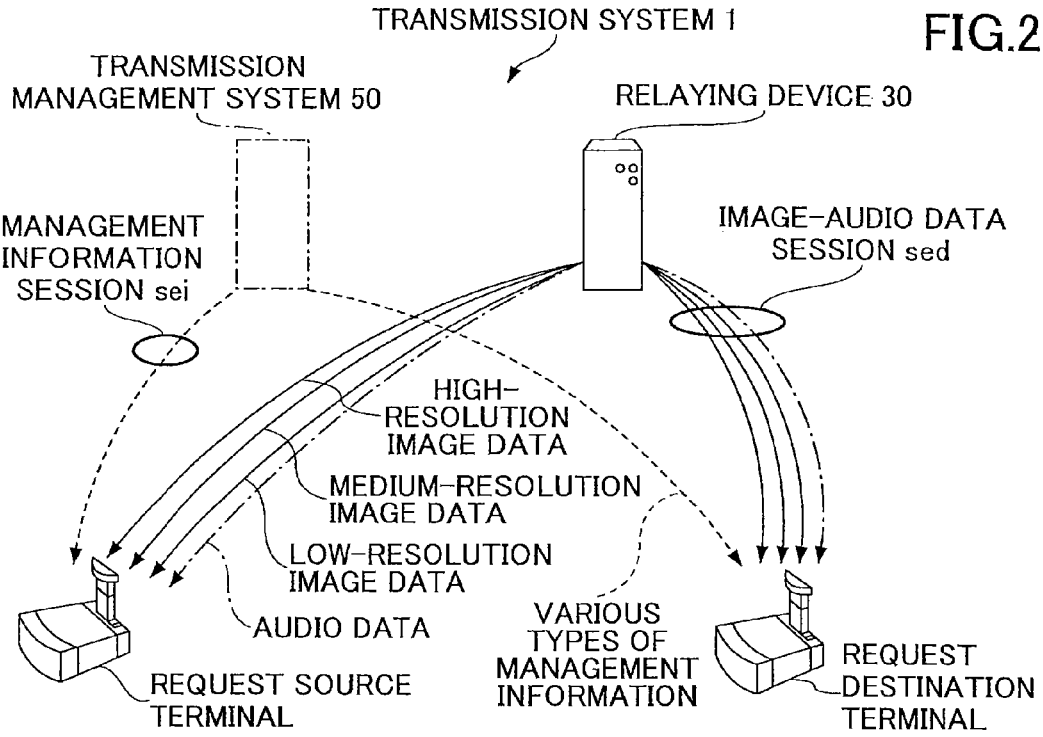


FIG.3A

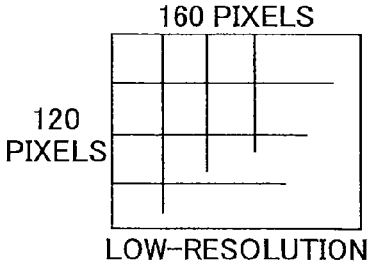


FIG.3B

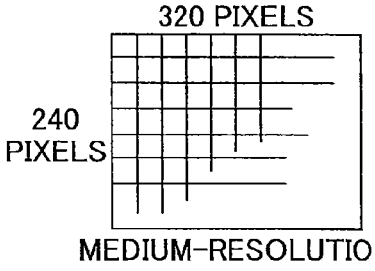


FIG.3C

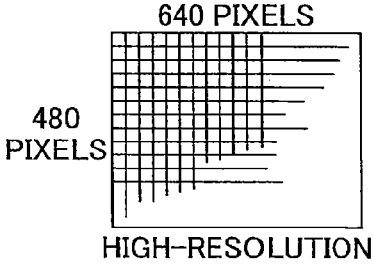


FIG.4

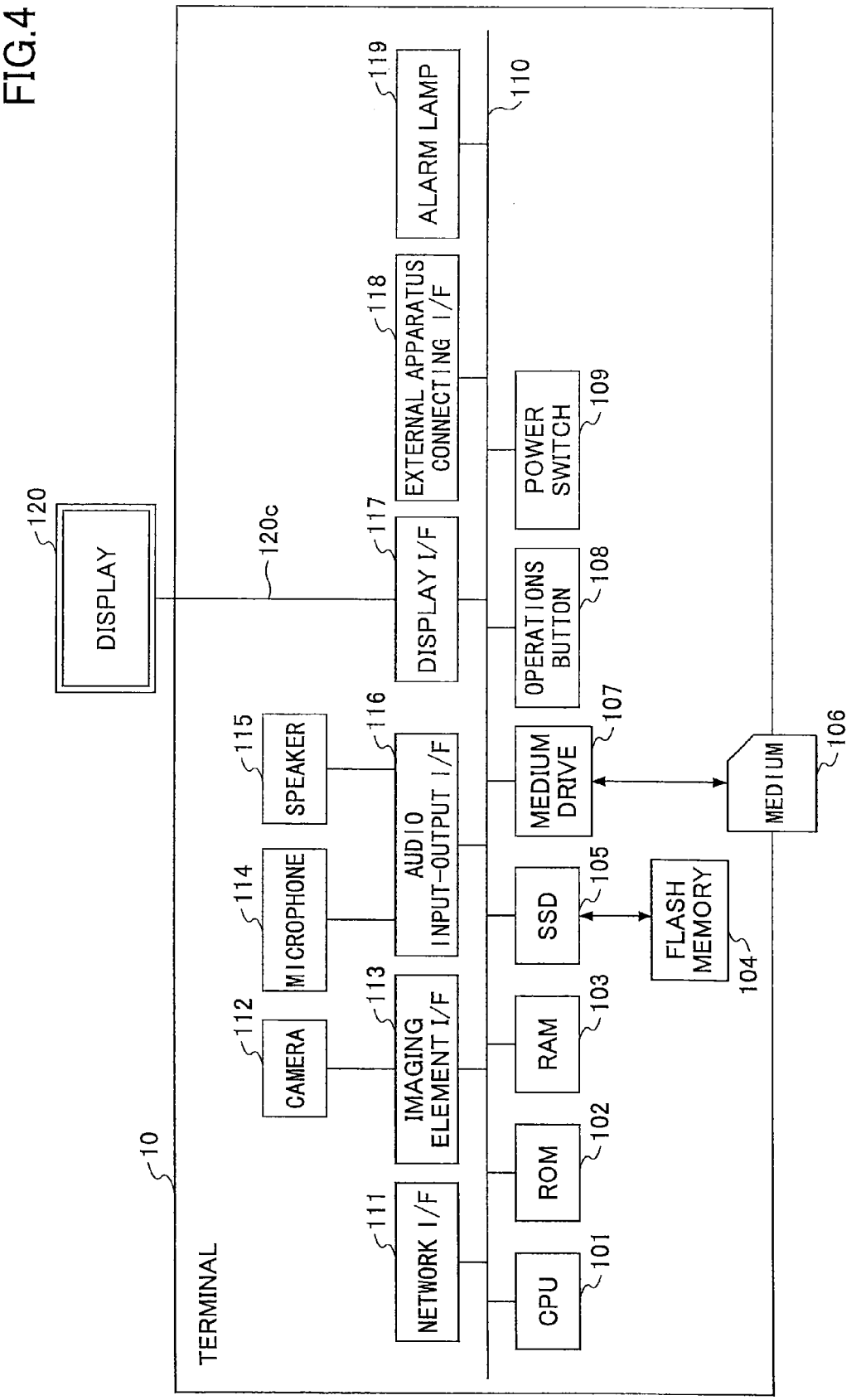

TERMINAL
10
CPU
101
ROM
102
RAM
103
SSD
105
FLASH MEMORY
104
MEDIUM DRIVE
107
MEDIUM
106
NETWORK I/F
111
IMAGING ELEMENT I/F
113
CAMERA
112
MICROPHONE
114
AUDIO INPUT-OUTPUT I/F
116
SPEAKER
115
DISPLAY I/F
117
DISPLAY
120
120c
OPERATIONS BUTTON
108
POWER SWITCH
109
EXTERNAL APPARATUS CONNECTING I/F
118
ALARM LAMP
119
110

FIG.5

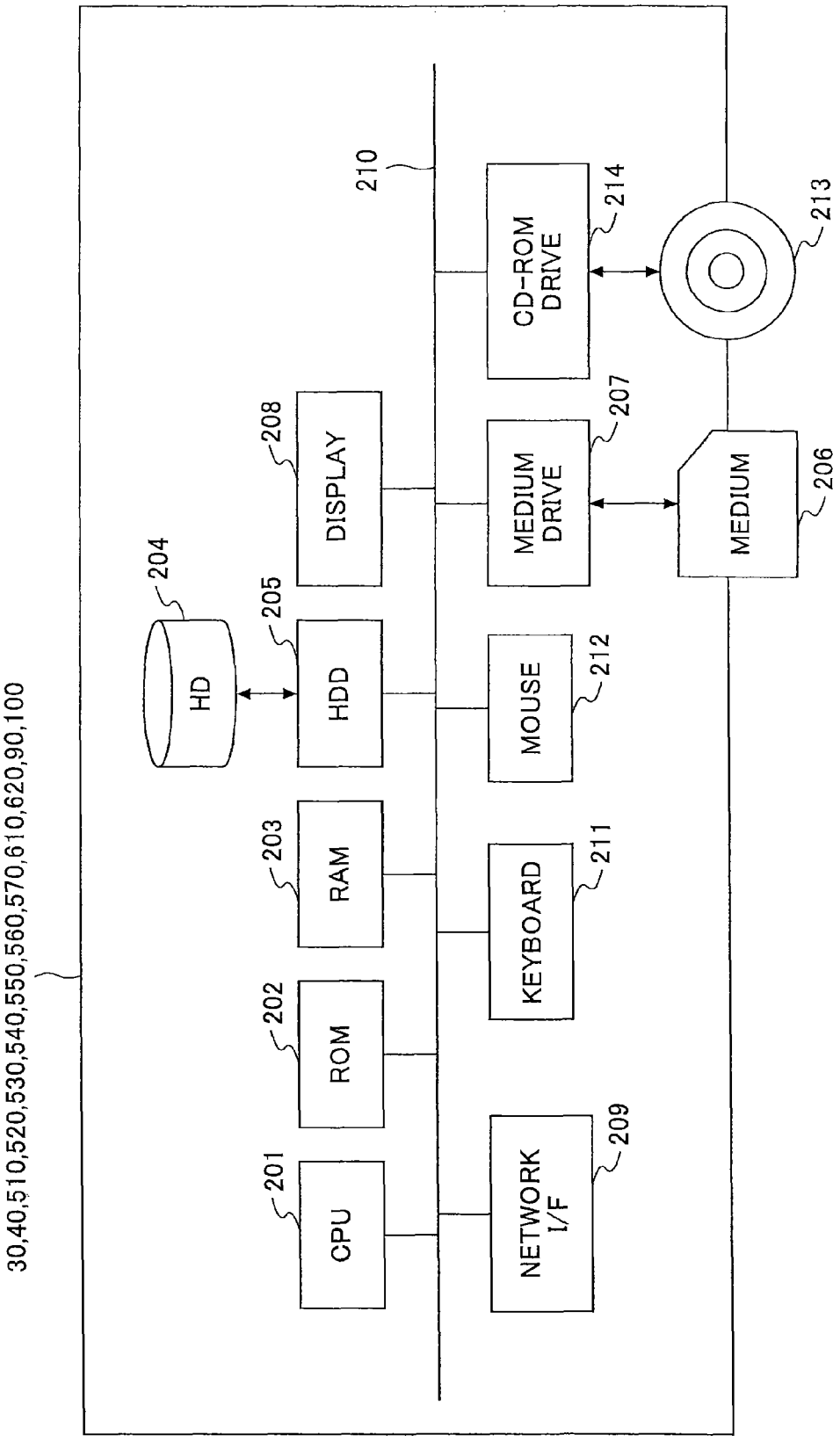
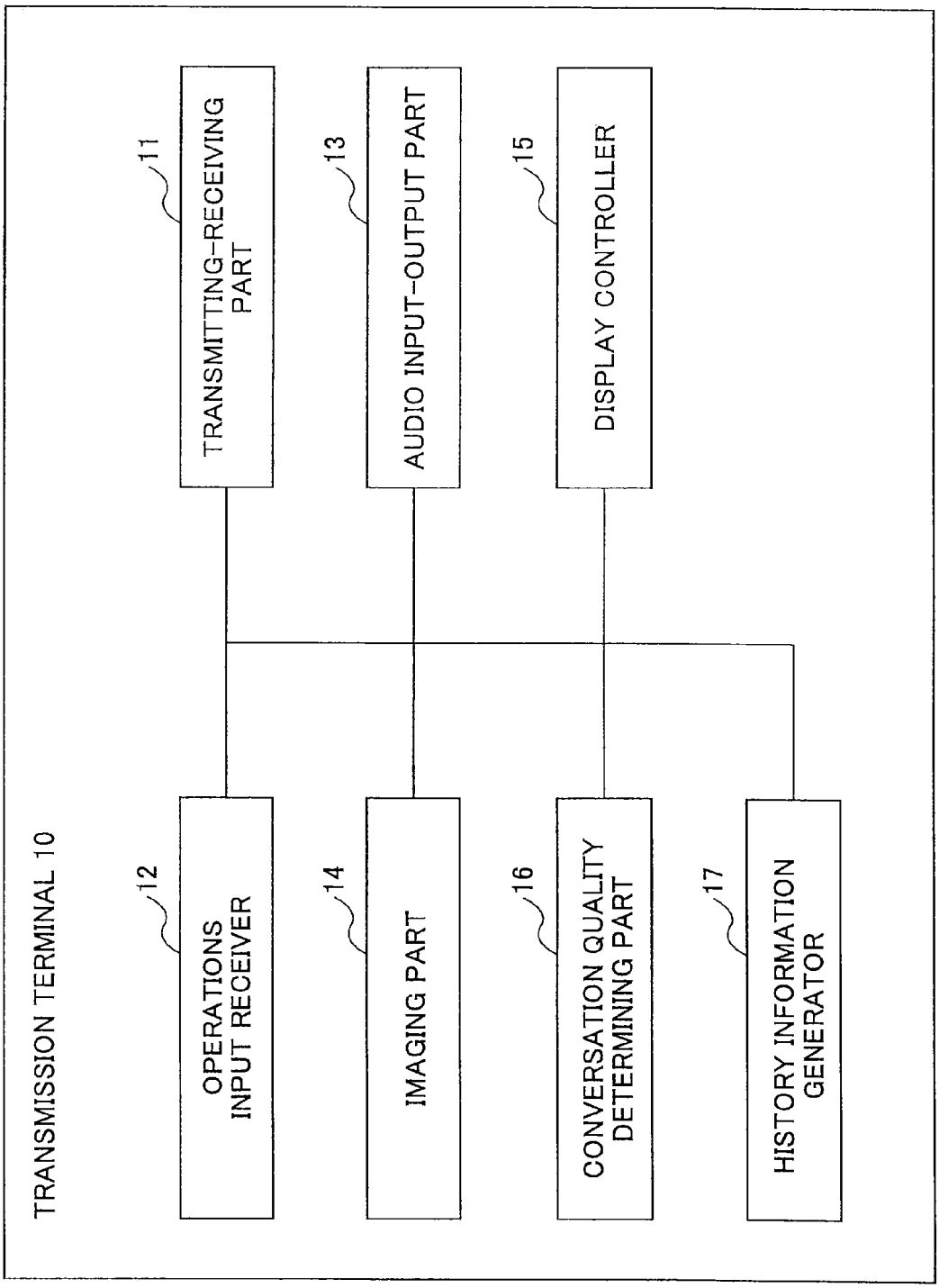

30,40,510,520,530,540,550,560,570,610,620,90,100
CPU
201
ROM
202
RAM
203
HD
204
HDD
205
DISPLAY
208
NETWORK I/F
209
KEYBOARD
211
MOUSE
212
MEDIUM DRIVE
207
CD-ROM DRIVE
214
210
MEDIUM
206
213

FIG.6


TRANSMISSION TERMINAL 10
11
TRANSMITTING-RECEIVING PART
13
AUDIO INPUT-OUTPUT PART
15
DISPLAY CONTROLLER
12
OPERATIONS INPUT RECEIVER
14
IMAGING PART
16
CONVERSATION QUALITY DETERMINING PART
17
HISTORY INFORMATION GENERATOR

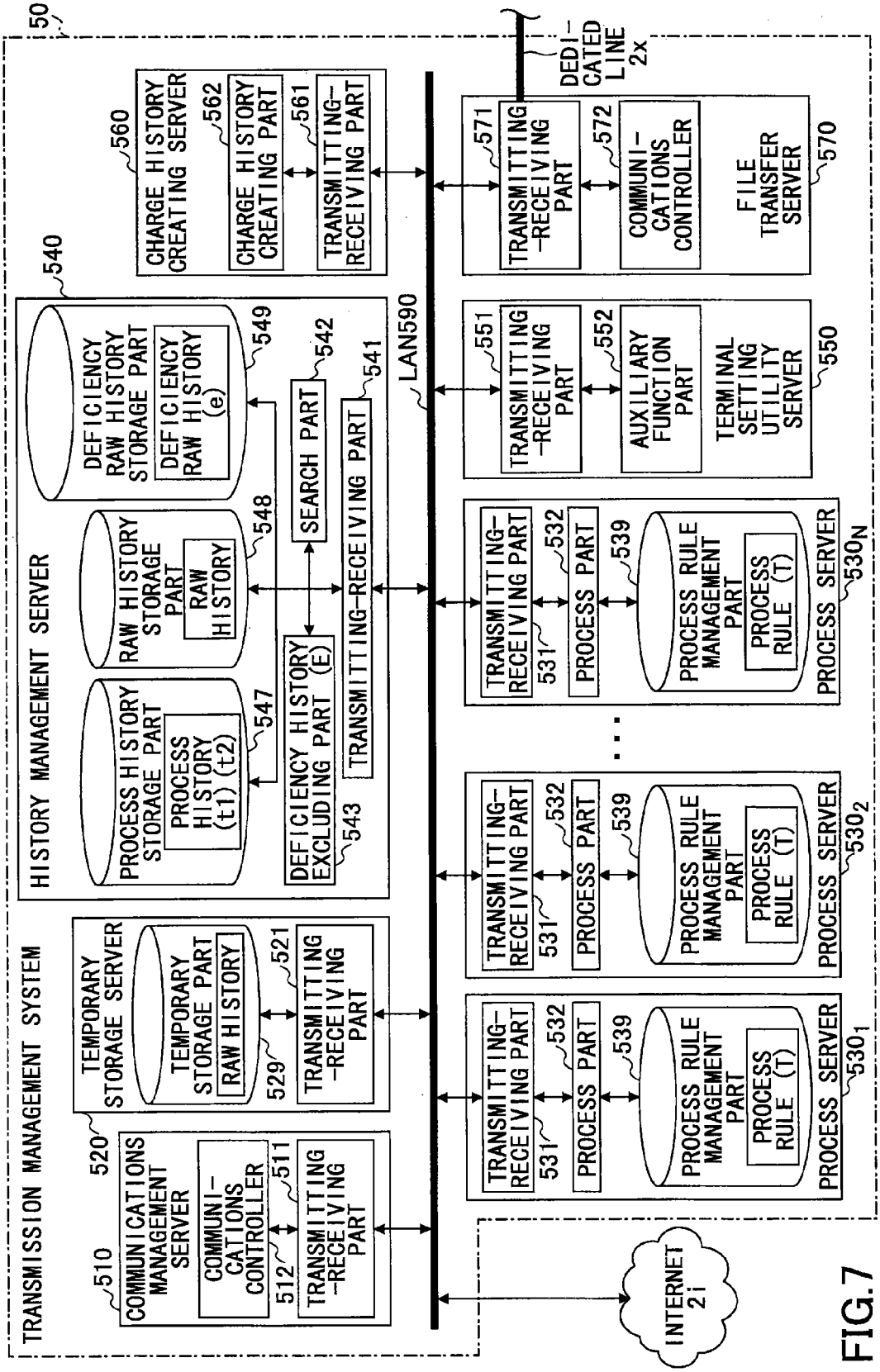

50
TRANSMISSION MANAGEMENT SYSTEM
510
COMMUNICATIONS MANAGEMENT SERVER
COMMUNI-CATIONS CONTROLLER
512
511
TRANSMITTING -RECEIVING PART
520
TEMPORARY STORAGE SERVER
TEMPORARY STORAGE PART
RAW HISTORY
529
521
TRANSMITTING -RECEIVING PART
HISTORY MANAGEMENT SERVER
540
PROCESS HISTORY STORAGE PART
PROCESS HISTORY (t1) (t2)
547
RAW HISTORY STORAGE PART
RAW HISTORY
548
DEFICIENCY HISTORY EXCLUDING PART (E)
543
SEARCH PART
542
TRANSMITTING-RECEIVING PART
541
DEFICIENCY RAW HISTORY STORAGE PART
DEFICIENCY RAW HISTORY (e)
549
LAN590
CHARGE HISTORY CREATING SERVER
560
CHARGE HISTORY CREATING PART
562
TRANSMITTING-RECEIVING PART
561
TRANSMITTING -RECEIVING PART
531
PROCESS PART
532
PROCESS RULE MANAGEMENT PART
PROCESS RULE (T)
539
PROCESS SERVER
530₁
TRANSMITTING -RECEIVING PART
531
PROCESS PART
532
PROCESS RULE MANAGEMENT PART
PROCESS RULE (T)
539
PROCESS SERVER
530₂
TRANSMITTING -RECEIVING PART
531
PROCESS PART
532
PROCESS RULE MANAGEMENT PART
PROCESS RULE (T)
539
PROCESS SERVER
530N
TRANSMITTING -RECEIVING PART
551
AUXILIARY FUNCTION PART
552
TERMINAL SETTING UTILITY SERVER
550
TRANSMITTING -RECEIVING PART
571
COMMUNI-CATIONS CONTROLLER
572
FILE TRANSFER SERVER
570
DEDI-CATED LINE 2x
INTERNET 2i

FIG.7

PROCESS RULE MANAGEMENT TABLE (T)

FIG.8

PROCESS START REQUIRE-MENT (COMMUNI-CATIONS STATUS)	POST-PROCESS TARGET TABLE	POST-PROCESS TARGET RECORD	PROCESS CONTENTS
COMMUNI-CATIONS STATUS=" invite"	CONFERENCE HISTORY MANAGEMENT TABLE (t2)	RECORDS HAVING IDENTICAL CONFERENCE ID	CONFERENCE ID=*CONFERENCE ID* ORGANIZER TERMINAL ID =*TRANSMITTING SOURCE TERMINAL ID*
COMMUNI-CATIONS STATUS=" start"	CONFERENCE HISTORY MANAGEMENT TABLE (t2)	RECORDS HAVING IDENTICAL CONFERENCE ID	CONFERENCE ID=*CONFERENCE ID* START DATE AND TIME =*COMMUNICATING DATE AND TIME* CONFERENCE HOURS=END DATE AND TIME -*COMMUNICATING DATE AND TIME*
COMMUNI-CATIONS STATUS=" end"	CONFERENCE HISTORY MANAGEMENT TABLE (t2)	RECORDS HAVING IDENTICAL CONFERENCE ID	CONFERENCE ID=*CONFERENCE ID* END DATE AND TIME =*COMMUNICATING DATE AND TIME* CONFERENCE HOURS=*COMMUNICATING DATE AND TIME* -START DATE AND TIME
COMMUNI-CATIONS STATUS=" join"	ATTENDEE HISTORY MANAGEMENT TABLE (t1)	RECORDS HAVING IDENTICAL CONFERENCE SESSION ID	TERMINAL ID=*TRANSMITTING SOURCE TERMINAL ID* CONFERENCE ID=*CONFERENCE ID* CONFERENCE SESSION ID=*CONFERENCE SESSION ID* ATTENDING DATE AND TIME =*COMMUNICATING DATE AND TIME* ATTENDING HOURS=(EXIT DATE AND TIME -*COMMUNICATING DATE AND TIME*) EXIT STATUS=" CONFERENCE IN PROGRESS"
COMMUNI-CATIONS STATUS=" leave"	ATTENDEE HISTORY MANAGEMENT TABLE (t1)	RECORDS HAVING IDENTICAL CONFERENCE SESSION ID	TERMINAL ID=*TRANSMITTING SOURCE TERMINAL ID* CONFERENCE ID=*CONFERENCE ID* CONFERENCE SESSION ID=*CONFERENCE SESSION ID* EXIT DATE AND TIME =*COMMUNICATING DATE AND TIME* ATTENDING HOURS =(*COMMUNICATING DATE AND TIME* -ATTENDING DATE AND TIME) EXIT STATUS=" NORMAL" CONVERSATION QUALITY=*CONVERSATION QUALITY*
COMMUNI-CATIONS STATUS="offline" CONFERENCE ID !=null CONFERENCE SESSION ID !=null	ATTENDEE HISTORY MANAGEMENT TABLE (t1)	RECORDS HAVING IDENTICAL CONFERENCE SESSION ID	TERMINAL ID=*TRANSMITTING SOURCE TERMINAL ID* CONFERENCE ID=*CONFERENCE ID* CONFERENCE SESSION ID=*CONFERENCE SESSION ID* EXIT DATE AND TIME =*COMMUNICATING DATE AND TIME* ATTENDING HOURS=(*COMMUNICATING DATE AND TIME* -ATTENDING DATE AND TIME) EXIT STATUS=" FORCED TERMINATION" CONVERSATION QUALITY=*CONVERSATION QUALITY*
. . .	. . .	. . .	. . .

FIG.9

COMMUNI-CATIONS STATUS	REQUEST SOURCE TERMINAL ID	DESTINA-TION TERMINAL ID	SES-SION ID	CONFER-ENCE ID	CONFER-ENCE SESSION ID	COMMUNI-CATIONS DATE AND TIME	CONVER-SATION QUALITY
online	110001	·	se001	·	·	2010-09-01 09:30:00	·
online	110002	·	se002	·	·	2010-09-01 09:30:00	·
online	110003	·	se003	·	·	2010-09-01 09:30:00	·
invite	110001	110002	·	conf001	·	2010-09-01 09:59:50	·
accept	110002	110001	·	conf001	·	2010-09-01 09:59:59	·
start	110001	·	·	conf001	·	2010-09-01 10:00:00	·
join	110001	·	·	conf001	cse001	2010-09-01 10:00:00	·
join	110002	·	·	conf001	cse002	2010-09-01 10:00:00	·
call	110003	110001	·	conf001	·	2010-09-01 10:09:50	·
accept	110001	110003	·	conf001	·	2010-09-01 10:09:59	·
join	110003	·	·	conf001	cse003	2010-09-01 10:10:00	·
leave	110002	·	·	conf001	cse002	2010-09-01 10:40:00	70
offline	110003	·	se003	conf001	cse003	2010-09-01 11:30:25	80
leave	110001	·	·	conf001	cse001	2010-09-01 11:30:25	100
end	110001	·	·	conf001	·	2010-09-01 11:30:25	·
offline	110001	·	se001	·	·	2010-09-01 11:35:00	·
offline	110002	·	se002	·	·	2010-09-01 11:40:00	·
...	...	...	...	...	...	...	...
online	110005	·	se005	·	·	2010-09-12 14:20:00	·
online	110006	·	se006	·	·	2010-09-12 14:21:00	·
invite	110005	110006	·	conf002	·	2010-09-12 14:29:50	·
accept	110006	110005	·	conf002	·	2010-09-12 14:29:55	·
start	110005	·	·	conf002	·	2010-09-12 14:30:00	·
join	110005	·	·	conf002	cse005	2010-09-12 14:30:00	·
...	...	...	...	...	...	...	...

FIG.10A

ATTENDING HISTORY MANAGEMENT TABLE (t1)

HISTORY ID	TERMINAL ID	CONFER-ENCE ID	CONFERENCE SESSION ID	ATTENDING DATE AND TIME	EXIT DATE AND TIME	ATTENDING HOURS	EXIT STATUS	CONVERSA-TION QUALITY
001	110001	conf001	cse001	2010-09-01 10:00:00	2010-09-01 11:30:25	01:30:25	EXIT	100
002	110002	conf001	cse002	2010-09-01 10:00:00	2010-09-01 10:40:00	00:40:00	EXIT	70
003	110003	conf001	cse003	2010-09-01 10:10:00	2010-09-01 11:30:25	01:20:25	FORCED TERMINATION	80
004	110005	conf002	cse005	2010-09-12 14:30:00	2010-09-12 15:35:25	01:05:25	EXIT	80
005	110001	conf002	cse005	2010-09-12 14:30:00	2010-09-12 15:40:10	01:10:10	EXIT	100
006	110002	conf002	cse005	2010-09-12 14:33:35	2010-09-12 15:40:10	01:06:35	EXIT	90
...	...	...	...	...	...	...	...	...

FIG.10B

CONFERENCE HISTORY MANAGEMENT TABLE (t2)

CONFERENCE ID	ORGANIZER TERMINAL ID	CONFERENCE START DATE AND TIME	CONFERENCE END DATE AND TIME	CONFERENCE HOURS
conf001	110001	2010-09-01 10:00:00	2010-09-01 11:30:25	01:30:25
conf002	110005	2010-09-12 14:30:00	—	—
...	...	...	...	...

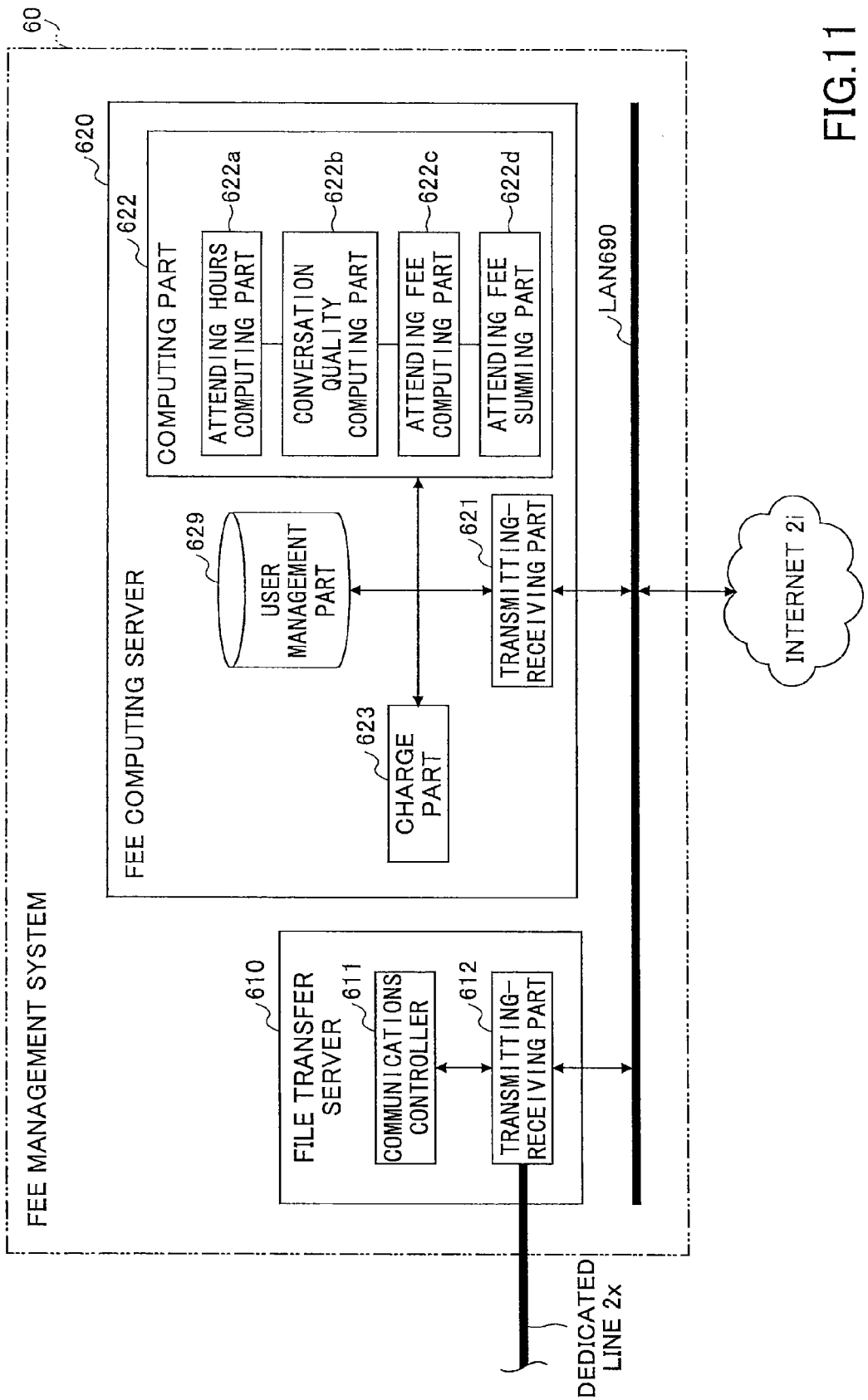

60
FEE MANAGEMENT SYSTEM
620
FEE COMPUTING SERVER
622
COMPUTING PART
622a
ATTENDING HOURS COMPUTING PART
622b
CONVERSATION QUALITY COMPUTING PART
622c
ATTENDING FEE COMPUTING PART
622d
ATTENDING FEE SUMMING PART
629
USER MANAGEMENT PART
621
TRANSMITTING-RECEIVING PART
623
CHARGE PART
LAN690
INTERNET 2i
610
FILE TRANSFER SERVER
611
COMMUNICATIONS CONTROLLER
612
TRANSMITTING-RECEIVING PART
DEDICATED LINE 2x

FIG.11

FIG.12

USER MANAGEMENT TABLE (Ty)

CONTRACT NUMBER	USER ID	USER NAME	USER ADDRESS	USER PHONE NUMBER	USER EMAIL ADDRESS	TERMINAL ID
20101005-0001	a123	AAA	Tokyo···	·····	·····	110001
						110002
						110003
						···
20110105-0001	b234	BBB	Osaka···	·····	·····	110011
						110012
						110013
						···
20110110-0001	c345	CCC	New York···	·····	·····	110021
						110022
						110023
						···
20110110-0002	d456	DDD	Washington,D.C.···	·····	·····	110031
						110032
						110033
						···
···	···	···	···	···	···	···

FIG.13

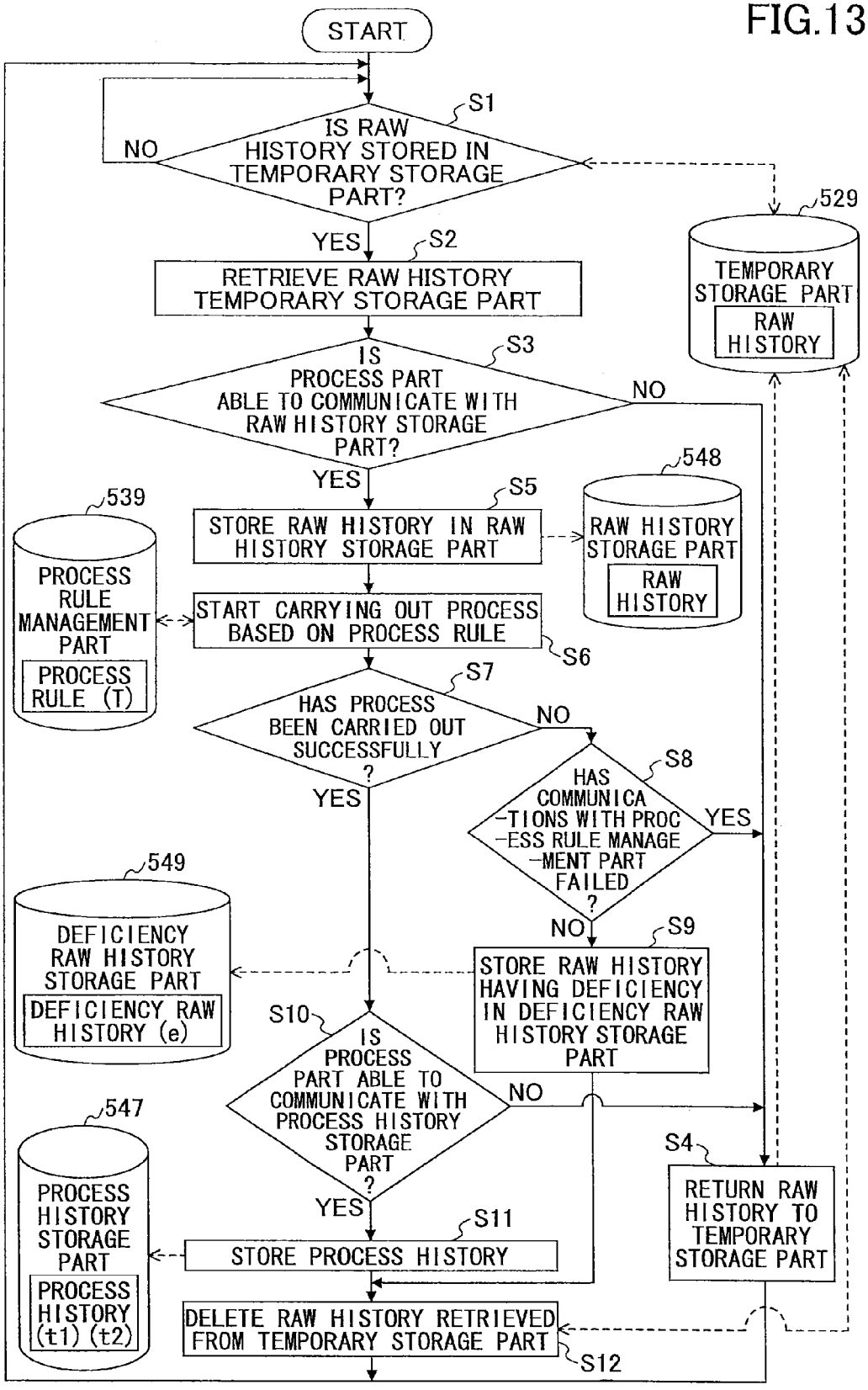

START
S1
IS RAW HISTORY STORED IN TEMPORARY STORAGE PART?
NO
YES
S2
RETRIEVE RAW HISTORY TEMPORARY STORAGE PART
529
TEMPORARY STORAGE PART
RAW HISTORY
S3
IS PROCESS PART ABLE TO COMMUNICATE WITH RAW HISTORY STORAGE PART?
NO
YES
548
539
S5
STORE RAW HISTORY IN RAW HISTORY STORAGE PART
RAW HISTORY STORAGE PART
RAW HISTORY
PROCESS RULE MANAGEMENT PART
PROCESS RULE (T)
START CARRYING OUT PROCESS BASED ON PROCESS RULE
S6
S7
HAS PROCESS BEEN CARRIED OUT SUCCESSFULLY ?
NO
YES
S8
HAS COMMUNICA-TIONS WITH PROC-ESS RULE MANAGE-MENT PART FAILED ?
YES
NO
549
S9
DEFICIENCY RAW HISTORY STORAGE PART
DEFICIENCY RAW HISTORY (e)
STORE RAW HISTORY HAVING DEFICIENCY IN DEFICIENCY RAW HISTORY STORAGE PART
S10
IS PROCESS PART ABLE TO COMMUNICATE WITH PROCESS HISTORY STORAGE PART ?
NO
547
S4
YES
PROCESS HISTORY STORAGE PART
PROCESS HISTORY (t1) (t2)
S11
STORE PROCESS HISTORY
RETURN RAW HISTORY TO TEMPORARY STORAGE PART
DELETE RAW HISTORY RETRIEVED FROM TEMPORARY STORAGE PART
S12

FIG.14

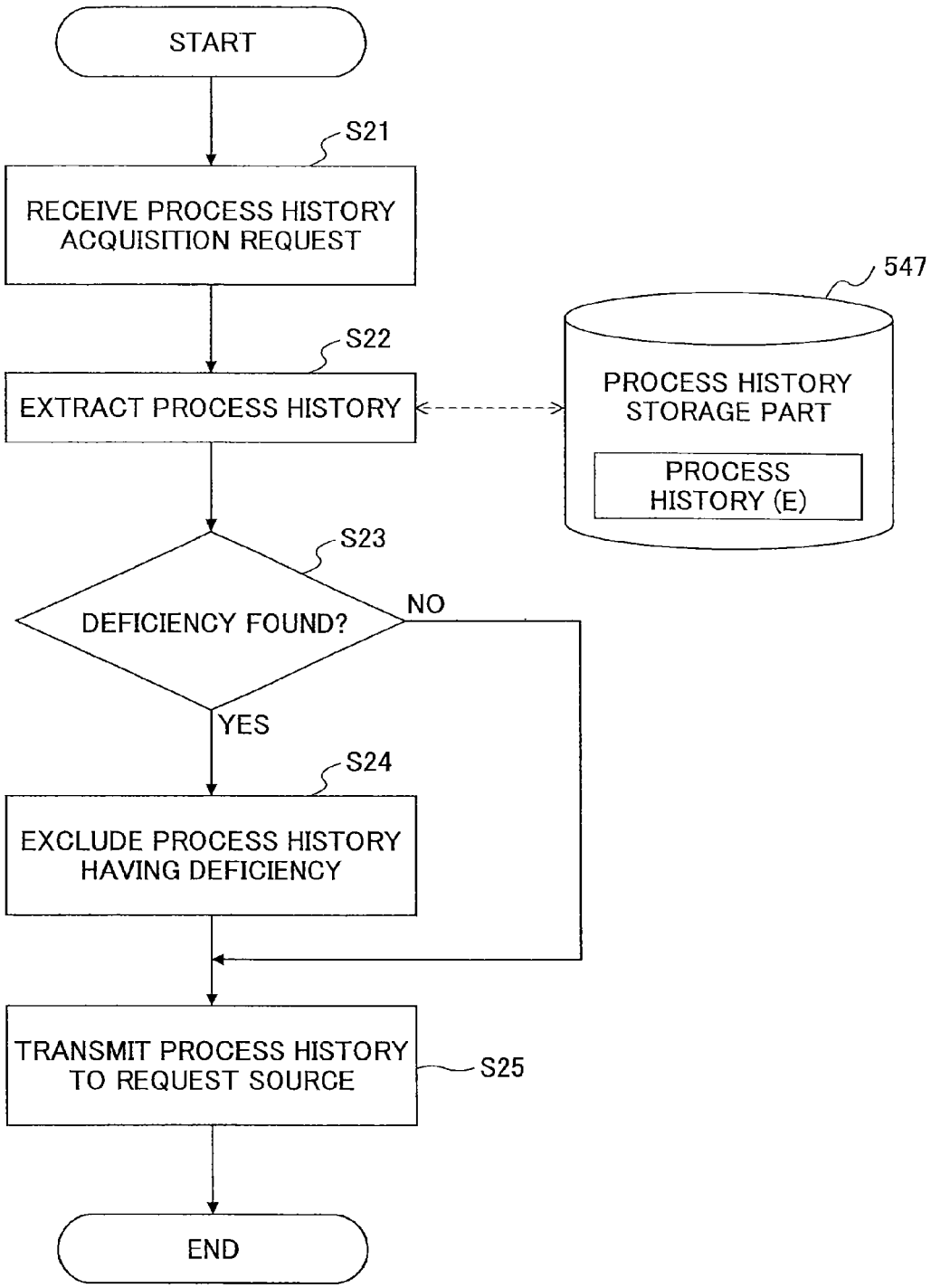

START
S21
RECEIVE PROCESS HISTORY ACQUISITION REQUEST
547
S22
EXTRACT PROCESS HISTORY
PROCESS HISTORY STORAGE PART
PROCESS HISTORY (E)
S23
DEFICIENCY FOUND?
NO
YES
S24
EXCLUDE PROCESS HISTORY HAVING DEFICIENCY
TRANSMIT PROCESS HISTORY TO REQUEST SOURCE
S25
END

FIG.15A

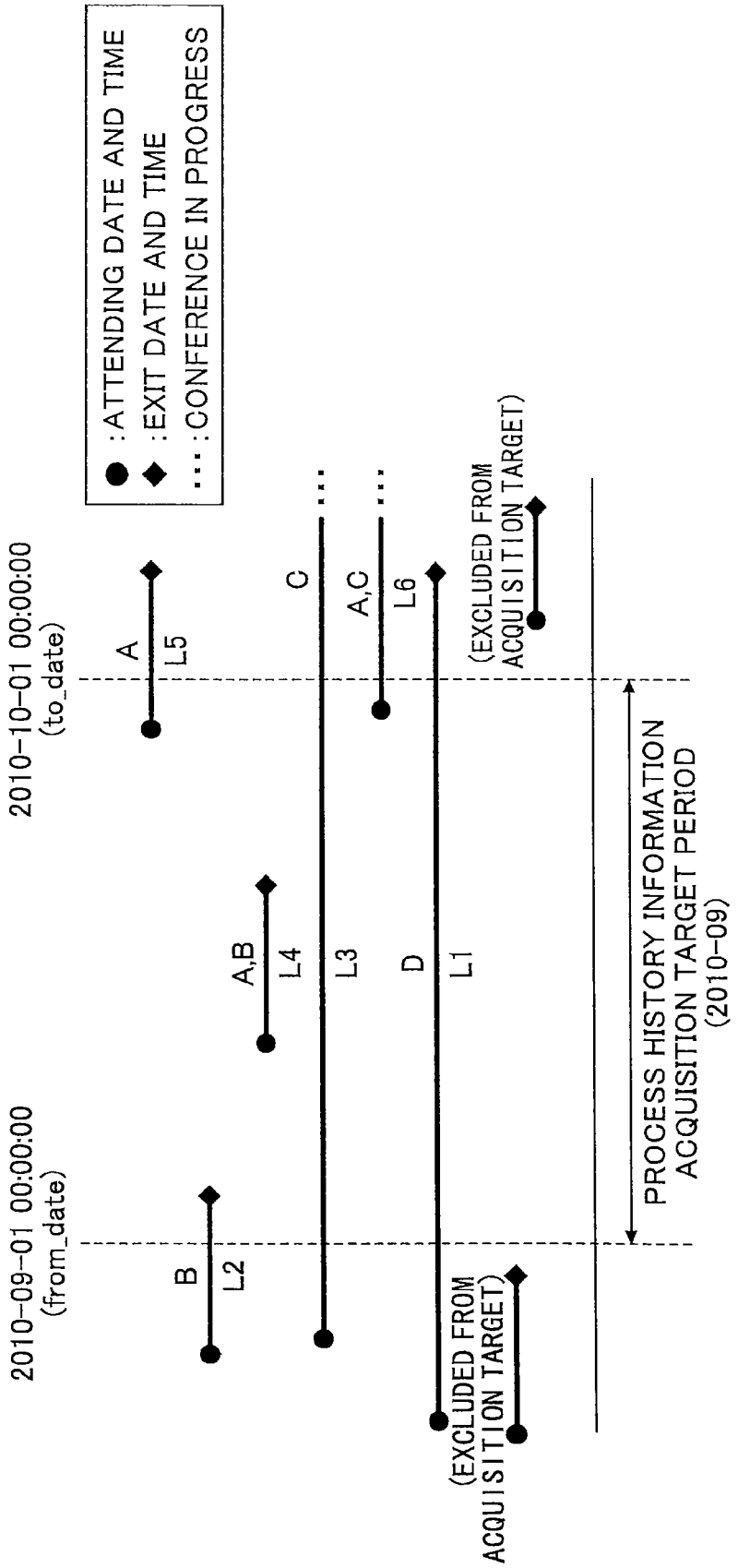

●:ATTENDING DATE AND TIME
◆:EXIT DATE AND TIME
・・・:CONFERENCE IN PROGRESS
2010-09-01 00:00:00
(from_date)
2010-10-01 00:00:00
(to_date)
B
L2
A,B
L4
C
L3
A,C
L6
D
L1
A
L5
(EXCLUDED FROM ACQUISITION TARGET)
(EXCLUDED FROM ACQUISITION TARGET)
PROCESS HISTORY INFORMATION ACQUISITION TARGET PERIOD (2010-09)

FIG.15B

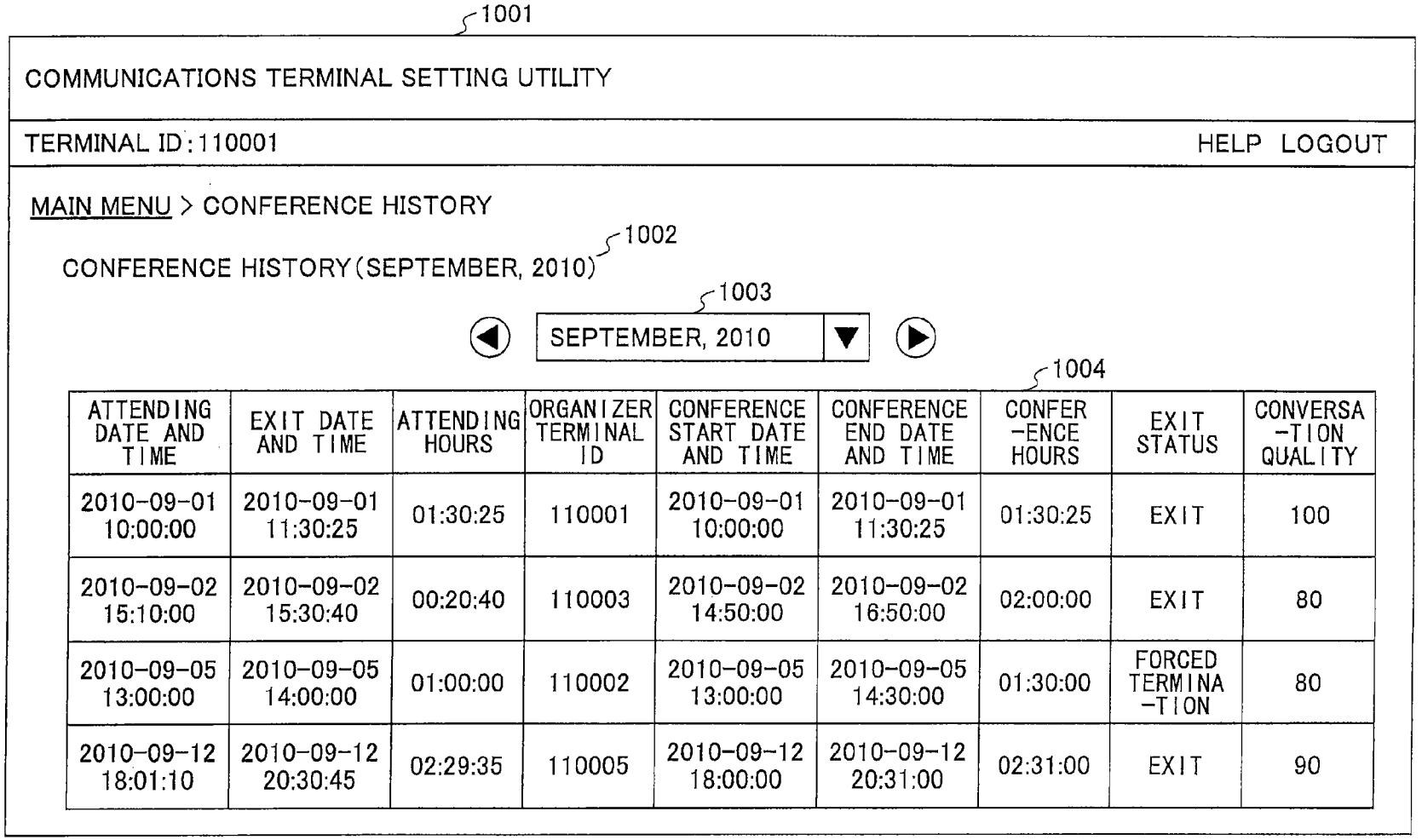
SEARCH REQUIREMENT A : (TERMINAL ID=TERMINAL ID OF ACQUISITION REQUEST SOURCE TERMINAL)&&
(from_date≦ATTENDING DATE AND TIME)&&(ATTENDING DATE AND TIME<to_date)

SEARCH REQUIREMENT B : (TERMINAL ID=TERMINAL ID OF ACQUISITION REQUEST SOURCE TERMINAL)&&
(from_date≦EXIT DATE AND TIME)&&(EXIT DATE AND TIME<to_date)

SEARCH REQUIREMENT C : (TERMINAL ID=TERMINAL ID OF ACQUISITION REQUEST SOURCE TERMINAL)&&
(EXIT STATUS=''CONFERENCE IN PROGRESS'')&&
(ATTENDING DATE AND TIME<to_date)

SEARCH REQUIREMENT D : (TERMINAL ID=TERMINAL ID OF ACQUISITION REQUEST SOURCE TERMINAL)&&
(ATTENDING HOURS≦to_date-from_date)&&
(ATTENDING DATE AND TIME<from_date)&&(EXIT DATE AND TIME≧to_date)

FIG.16



ATTENDING DATE AND TIME	EXIT DATE AND TIME	ATTENDING HOURS	ORGANIZER TERMINAL ID	CONFERENCE START DATE AND TIME	CONFERENCE END DATE AND TIME	CONFER-ENCE HOURS	EXIT STATUS	CONVERSA-TION QUALITY
2010-09-01 10:00:00	2010-09-01 11:30:25	01:30:25	110001	2010-09-01 10:00:00	2010-09-01 11:30:25	01:30:25	EXIT	100
2010-09-02 15:10:00	2010-09-02 15:30:40	00:20:40	110003	2010-09-02 14:50:00	2010-09-02 16:50:00	02:00:00	EXIT	80
2010-09-05 13:00:00	2010-09-05 14:00:00	01:00:00	110002	2010-09-05 13:00:00	2010-09-05 14:30:00	01:30:00	FORCED TERMINA-TION	80
2010-09-12 18:01:10	2010-09-12 20:30:45	02:29:35	110005	2010-09-12 18:00:00	2010-09-12 20:31:00	02:31:00	EXIT	90

FIG.17

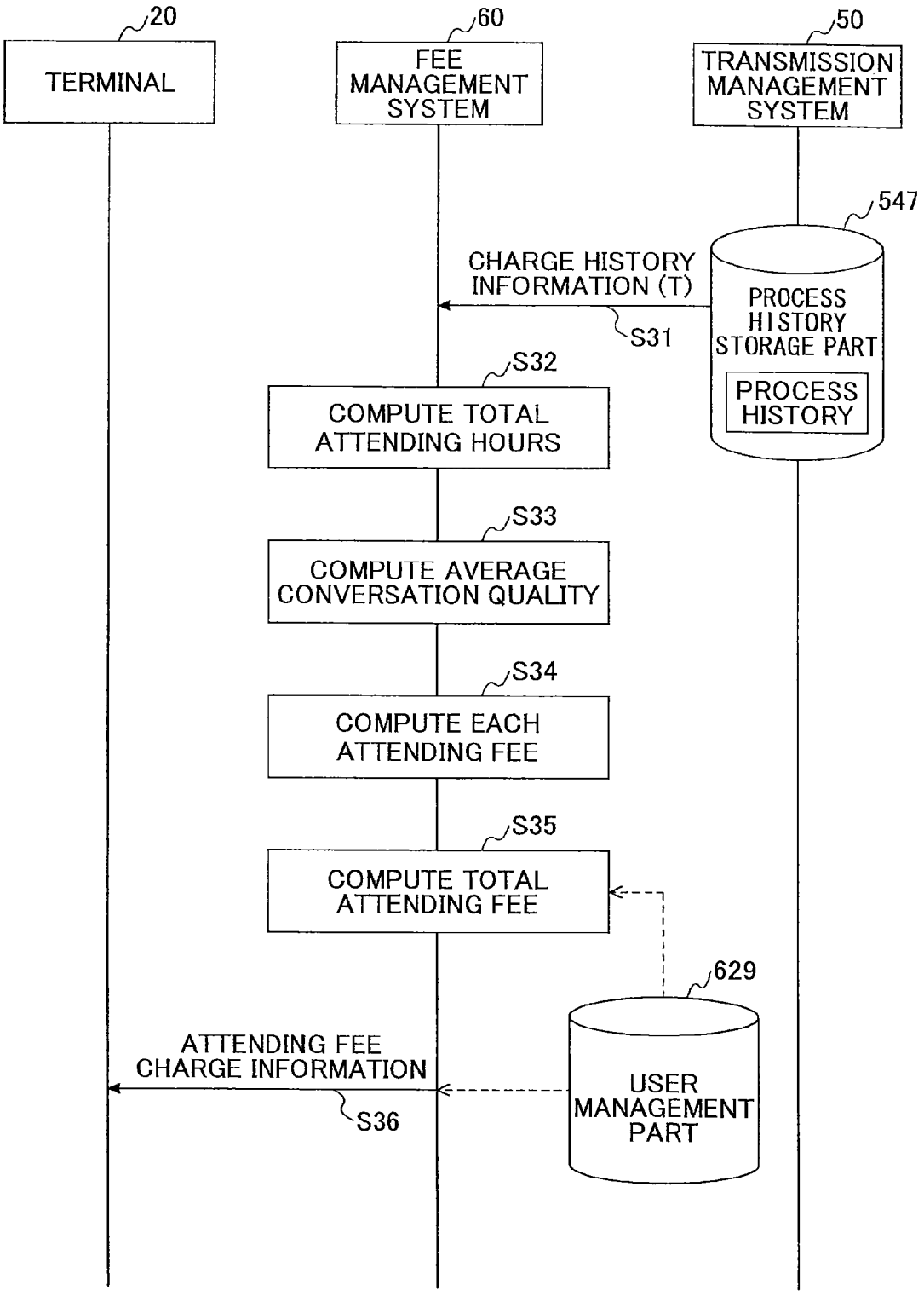

20
TERMINAL
60
FEE MANAGEMENT SYSTEM
50
TRANSMISSION MANAGEMENT SYSTEM
547
PROCESS HISTORY STORAGE PART
PROCESS HISTORY
CHARGE HISTORY INFORMATION (T)
S31
S32
COMPUTE TOTAL ATTENDING HOURS
S33
COMPUTE AVERAGE CONVERSATION QUALITY
S34
COMPUTE EACH ATTENDING FEE
S35
COMPUTE TOTAL ATTENDING FEE
629
USER MANAGEMENT PART
ATTENDING FEE CHARGE INFORMATION
S36

FIG.18

USER ID	TERMINAL ID	TOTAL ATTENDING HOURS FOR EACH TERMINAL	AVERAGE CONVERSATION QUALITY	ATTENDING FEE FOR EACH TERMINAL	ATTENDING FEE FOR EACH USER
a123	110001	21 hr 32 min	80	¥10,336	¥24,554
	110002	17 hr 54 min	70	¥7,518	
	110003	11 hr 10 min	100	¥6,700	
b234	110001	14 hr 47 min	100	¥8,870	¥26,793
	110001	12 hr 35 min	95	¥7,173	
	110001	11 hr 10 min	100	¥10,750	
c345	110001	22 hr 03 min	98	¥12,965	¥34,474
	110001	20 hr 45 min	100	¥12,450	
	110001	15 hr 15 min	99	¥9,059	
d456	110001	8 hr 45 min	100	¥5,250	¥16,864
	110001	16 hr 38 min	100	¥9,980	
	110001	2 hr 45 min	99	¥1,634	
...	...	...	...	...	...

FIG.19A

ATTENDING HISTORY MANAGEMENT TABLE (t11)

HISTORY ID	TERMINAL ID	CONFERENCE ID	CONFERENCE SESSION ID	ATTENDING DATE AND TIME	EXIT DATE AND TIME	ATTENDING HOURS	EXIT STATUS	CONVERSA-TION QUALITY	DEFI-CIENCY FLAG
001	110001	conf001	cse001	2010-09-01 10:00:00	2010-09-01 11:30:25	01:30:25	EXIT	100	1
002	110002	conf001	cse002	2010-09-01 10:00:00	2010-09-01 10:40:00	00:40:00	EXIT	70	1
003	110003	conf001	cse003	2010-09-01 10:10:00	2010-09-01 11:30:25	01:20:25	FORCED TERMINATION	80	1
004	110005	conf002	cse005	2010-09-12 14:30:00	2010-09-12 15:35:25	01:05:25	EXIT	80	1
005	110001	conf002	cse005	2010-09-12 14:30:00	2010-09-12 15:40:10	01:10:10	EXIT	100	1
006	110002	conf002	cse005	2010-09-12 14:33:35	2010-09-12 15:40:10	01:06:35	EXIT	90	1
...	...	...	...	...	...	...	...	...	...

FIG.19B

CONFERENCE HISTORY MANAGEMENT TABLE (t12)

CONFERENCE ID	ORGANIZER TERMINAL ID	CONFERENCE START DATE AND TIME	CONFERENCE END DATE AND TIME	CONFERENCE HOURS	DEFICIENCY FLAG
conf001	110001	2010-09-01 10:00:00	2010-09-01 11:30:25	01:30:25	1
conf002	110005	2010-09-12 14:30:00	—	—	1
...	...	...	...	...	...

FEE MANAGEMENT SYSTEM, TRANSMISSION SYSTEM, AND FEE MANAGEMENT METHOD

BACKGROUND OF THE INVENTION

1. Field of the Invention

The disclosures herein are generally related to a fee management system, a transmission system, and a fee management method.

2. Description of the Related Art

There has been a dramatic increase in the number of people who remotely hold conversations with each other using transmission terminals such as PCs (personal computers) or mobile phones. Further, such a conversation (e.g., conference) may be held not only between the two locations (two people) but also be held between multiple locations (three or more people).

Further, an administrator who administers communications service for holding the conversation between the transmission terminals (users) obtains profits by charging each of users of the transmission terminals a communication fee. Japanese Laid-open Patent Publication No. 9-172509 (hereinafter referred to as "Patent Document 1") discloses a method of equally charging each of attendees of the conversation a communication fee from a start to an end of the conversation. This method manages communication fees of multiple locations so as to efficiently manage the communications fees for an entire conference. More specifically, this method pertains to a method for controlling a multiple location conference that is simultaneously held at three or more locations. The method includes managing communication fees of conference attending terminals (i.e., terminals used by conference attendees) and a communication fee of a multiple location conference control apparatus.

RELATED ART DOCUMENTS

Patent Document

Patent Document 1: Japanese Laid-open Patent Publication No. 9-172509

SUMMARY OF THE INVENTION

It is a general object of at least one embodiment of the present invention to provide a fee management system, a transmission system, and a fee management method that substantially obviate one or more problems caused by the limitations and disadvantages of the related art.

According to one aspect of the embodiment, there is provided a fee management system for managing attending fees that are charged when a plurality of transmission terminals attend a conversation in a transmission management system, which manages transmission of information associated with the conversation between the transmission terminals. The fee management system includes an acquisition unit configured to acquire attending hours information and conversation quality information, the attending hours information indicating attending hours for which each of the transmission terminals has attended the conversation, the conversation quality information indicating conversation communication service quality provided during the conversation; an attending hours computing unit configured to compute total attending hours based on the attending hours information, the total attending hours indicating hours for which the respective terminals have attended the conversation; and an attending fee computing unit configured to compute an attending fee for each of the terminals based on the corresponding total attending hours and the conversation quality information.

The object and advantages of the invention will be realized and attained by means of the elements and combinations particularly pointed out in the claims.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are not restrictive of the invention as claimed.

Other objects and further features of the present invention will be apparent from the following detailed description when read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic diagram illustrating a transmission system according to an embodiment;

FIG. **2** is a schematic diagram illustrating a transmitting or receiving status of image data, audio data, and various types of management information in the transmission system;

FIGS. **3**A to **3**C are schematic diagrams illustrating qualities of the image data;

FIG. **4** is a hardware configuration diagram illustrating a transmission terminal according to an embodiment;

FIG. **5** is a hardware configuration diagram illustrating the transmission terminal according to the embodiment;

FIG. **6** is a functional block diagram illustrating a terminal according to an embodiment;

FIG. **7** is a functional block diagram illustrating a management system according to an embodiment;

FIG. **8** is a schematic diagram illustrating a process rule management table;

FIG. **9** is a schematic diagram illustrating raw history information;

FIG. **10**A is a schematic diagram illustrating an attendee history management table;

FIG. **10**B is a schematic diagram illustrating a conference history management table;

FIG. **11** is a functional block diagram illustrating a fee management system serving as a featured part of an embodiment;

FIG. **12** is a schematic diagram illustrating a user management table;

FIG. **13** is a flowchart illustrating a process performed by the management system in which raw history information is processed to create process history information;

FIG. **14** is a flowchart illustrating a process from receiving an acquisition request for acquiring process history information from a user to providing the user with the process history information;

FIG. **15**A is a diagram illustrating an acquisition target period of the process history information;

FIG. **15**B is a diagram illustrating search requirements for searching for raw history information;

FIG. **16** is a diagram illustrating an example of a screen displayed on a display of an external input apparatus;

FIG. **17** is a sequence diagram illustrating a fee charge method;

FIG. **18** is a schematic diagram illustrating a summary of attending fees;

FIG. **19**A is a schematic diagram illustrating an attendee history management table; and

FIG. **19**B is a schematic diagram illustrating a conference history management table.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the following, a description will be given of embodiments with reference to FIGS. **1** to **18**. Note that FIG. **1** is a schematic configuration diagram illustrating a transmission system **1** according to an embodiment. The transmission system **1** includes a data providing system configured to transmit content data from a transmission terminal to another transmission terminal via a transmission management system **50**, or a communications system configured to mutually transmit information, emotions, or the like between a plural transmission terminals via the transmission management system. The communications system serves as a system for mutually transmitting information, emotions, or the like between plural communications terminals (i.e., the "transmission terminals") via a communications management system (i.e., the "transmission management system"). Examples of such a communications system include a teleconference system, a videophone system, and a mobile phone system.

The present embodiment describes a transmission system, a transmission management system, a transmission terminal, and the like, based on the assumption in which the teleconference system serves as an example of the communications system, the teleconference management system serves as an example of the communications management system, and a teleconference terminal serves as an example of the communications terminal. That is, a transmission terminal and a transmission management system in the present embodiment may not only be applied to the teleconference system but may also be applied to the communications system or the transmission system. Note that in the present embodiment, the term "teleconference" is used; however, the "teleconference" may also be referred to as a "videoconference", as these two terms indicate the same contents and may be used interchangeably.

Overall Configuration of Embodiment

The present embodiment illustrates a case in which users of the transmission system **1** are four offices including a Tokyo office, an Osaka office, a New York office, and a Washington, D.C. office.

In FIG. **1**, terminals residing in the inner side of the network from the router **70***a* are managed by the Tokyo office, terminals residing in the inner side of the network from the router **70***b* are managed by the Osaka office, terminals residing in the inner side of the network from the router **70***c* are managed by the New York office, and terminals residing in the inner side of the network from the router **70***d* are managed by the Washington, D.C. office.

The Tokyo office has plural communicators (attendees) using transmission terminals (**10***aa*, **10***ab*, **10***ac*, . . .) to converse (communicate) with other transmission terminals. The communicators (attendees) may, for example, be employees.

Further, the Tokyo office has a single administrator or plural administrators using user terminals **20***a* that receive attending fees from a later-described fee management system **60** as well as managing the transmission terminals (**10***aa*, **10***ab*, **10***ac*, . . .). Note that each of the Osaka office, the New York office, and the Washington, D.C. office has plural communicators (attendees) and a single administrator or plural administrators.

Further, in this embodiment, attending fees may be generated by the users of the transmission terminals attending the conversations (e.g., conference) using the transmission system **1** in addition to the communications fees due to the communications between the transmission terminals. The communications fees correspond to packet communications fees charged by an electronic communications company. At present, there is provided a fee plan for unlimited use of packet communications with a predetermined monthly fee. Further, the attending fee may be a total amount of charge when each of the communicators attends conversation with another communicator using the transmission terminals. The attending fee may be charged by the administrator of the transmission system **1** for each of the users. That is, in this embodiment, the attending fee is not necessarily charged per communicator belonging to the user or transmission terminal used by the user.

Further, in this embodiment, it is assumed that the users pay the respective attending fee and communication fees separately. Note that the respective users do not have to be different offices but may be different companies or individuals.

The transmission system **1** illustrated in FIG. **1** includes transmission terminals (**10***aa*, **10***ab*, . . .) used by the respective communicators, user terminals (**20***a*, **20***b*, **20***c*, and **20***d*) used by user administrators, displays (**120***aa*, **120***ab*, . . .) of the respective transmission terminals (**10***aa*, **10***ab*, . . .), external input apparatuses (**40***aa*, **40***ab*, . . .) serving as client personal computers (PCs), relay devices (**30***a*, **30***b*, **30***c*, and **30***d*), a transmission management system **50**, a fee management system **60**, a program providing system **90**, and a maintenance system **100**. The transmission terminals **10** are configured to transmit image data and audio data when receiving the image data and the audio data as an example of content data.

Note that in the following, any of the transmission terminals (**10***aa*, **10***ab*, . . .) may be represented by the "terminal **10**", and any of the user terminals (**20***aa*, **20***ab*, . . .) may be represented by the "terminal **20**". Further, any of the displays (**120***aa*, **120***ab*, . . .) may be represented by the "display **120**", any of the external input apparatuses (**40***aa*, **40***ab*, . . .) may be represented by the "external input apparatus **40**", and any of the relay devices (**30***a*, **30***b*, **30***c*, and **30***d*) may be represented by the "relay device **30**". In addition, a terminal serving as a request source to request initiation of a teleconference may be represented by a "request source terminal", and a terminal serving as a request destination (relay destination) may be represented by a "destination terminal".

FIG. **2** is a schematic diagram illustrating a transmitting or receiving status of the image data, the audio data, and various types of management information in the transmission system. As illustrated in FIG. **2**, in the transmission system **1**, a management information session sei for transmitting or receiving various types of management information is established between the request source terminal and the destination terminal via a transmission management system **50**. Further, four sessions for transmitting or receiving the respective four data sets including high resolution image data, medium resolution image data, low resolution image data, and the audio data are established between the request source terminal and the destination terminal via the relay device **30**. In this example, the four sessions are integrally represented by an image-audio data session sed. Note that image data sessions are not necessarily divided based on resolution levels. Note also that the image data sessions may be less than three or more than three.

Note that a description is given of image resolutions of image data handled in the present embodiment with reference to FIGS. **3**A to **3**C. FIGS. **3**A to **3**C are schematic diagrams illustrating qualities of the image data. FIG. **3**A illustrates a low resolution image serving as a base image having 160 pixels in a horizontal direction and 120 pixels in a vertical direction. FIG. **3**B illustrates a medium resolution image having 320 pixels in a horizontal direction and 240 pixels in a vertical direction. FIG. **3**C illustrates a high resolution image having 640 pixels in a horizontal direction and 480 pixels in a vertical direction. Among these, when the image data are relayed via a narrowband route, the low resolution image data formed of low resolution image data alone serving as a base image are relayed. When the image data are relayed via a relatively wideband route, the low resolution image data serving as the base image, and the medium resolution image data formed of medium resolution image data are relayed. Further, when the image data are relayed via a extremely wideband route, the low resolution image data serving as the base image, the medium resolution image data formed of medium resolution image data, and the high resolution image data formed of high resolution image data are relayed. Note also that the image data may be dynamic or static images or a combination of the dynamic and static image data.

The relay device **30** illustrated in FIG. **1** is configured to relay content data between plural terminals **10**.

The transmission management system **50** is configured to manage login authentication requested by the terminals **10**, call conditions of the terminals **10**, a list of addresses (destinations), communication histories, and communications conditions of the relay devices **30** in a unitary manner. Note that a detailed description of the transmission management system **50** will be given later.

The fee management system **60** may be the features of the embodiment of the present invention. The fee management system **60** is configured to compute an attending fee for each user, and manage a fee including the attending fee that is charged to each user. Note that a detailed description of the fee management system **60** will be given later. Alternatively, the fee management system **60** may be configured not only to compute the attending fee but also to calculate a communications fee for each user so as to manage charging of the communications fee to each user.

The routers (**70***a*, **70***b*, **70***c*, **70***d*, **70***ab*, **70***cd*) is configured to select the optimal route for transmitting image data and audio data. Note that in the following, any of the routers (**70***a*, **70***b*, **70***c*, **70***d*, **70***ab*, **70***cd*) may be represented by the "router **70**".

The program providing system **90** includes a later-described hard disk (HD) **204**. The HD **204** is configured to store terminal programs to cause the terminal **10** to implement various functions (or allow the terminal **10** to function as various units), and transmit the terminal programs to the terminal **10**. Further, the HD **204** of the program providing system **90** is configured to further store relay device programs to cause the relay device **30** to implement various functions (or allow the relay device **30** to function as various units), and transmit the relay device programs to the relay device **30**.

Moreover, the HD **204** of the program providing system **90** is configured to further store transmission management programs to cause the transmission management system **50** to implement various functions (or allow the transmission management system **50** to function as various units), and transmit the transmission management programs to the transmission management system **50**. Further, the HD **204** of the program providing system **90** is configured to store fee management programs to cause the fee management system **60** to implement various functions (or allow the fee management system **60** to function as various units), and transmit the fee management programs to the fee management system **60**.

The maintenance system **100** serves as a computer configured to maintain, manage, and service at least one of the terminal **10**, the relay device **30**, the transmission management system **50**, the fee management system **60**, and the program providing system **90**. For example, when the maintenance system **100** is domestically installed, and the terminal **10**, the relay device **30**, the transmission management system **50**, the fee management system **60**, or the program providing system **90** is installed overseas (internationally), the maintenance system **100** may remotely maintain, manage, and service at least one of the terminal **10**, the relay device **30**, the transmission management system **50**, the fee management system **60**, and the program providing system **90** via the communications network **2**. Further, the maintenance system **100** is configured to further maintain a model number, a serial number, a sale destination, service, or a failure history of at least one of the terminal **10**, the relay device **30**, the transmission management system **50**, the fee management system **60**, and the program providing system **90**.

Note that the terminals (**10***aa*, **10***ab*, . . .), the relay device **30***a*, and the router **70***a* are connected via the LAN **2***a* such that they communicate with one another. The external input apparatuses (**40***aa*, **40***ab*, . . .) are connected to the terminals (**10***aa*, **10***ab*, . . .), respectively, such that they communicate with one another. The terminals (**10***ba*, **10***bb*, . . .), the relay device **30***b*, and the router **70***b* are connected via the LAN **2***b* such that they communicate with one another. The external input apparatuses (**40***ba*, **40***bb*, . . .) are connected to the terminals (**10***ba*, **10***bb*, . . .), respectively, such that they communicate with one another. Further, the LAN **2***a* and LAN **2***b* are connected to the dedicated line **2***ab* including the router **70***ab* such that they communicate with one another within a predetermined region A. For example, the region A may be Japan, and the LAN **2***a* is installed within the Tokyo office whereas the LAN **2***b* is installed within Osaka office, as already described above.

On the other hand, the terminals (**10***ca*, **10***cb*, . . .), the relay device **30***c*, and the router **70***c* are connected via the LAN **2***c* such that they communicate with one another. The external input apparatuses (**40***ca*, **40***cb*, . . .) are connected to the terminals (**10***ca*, **10***cb*, . . .), respectively, such that they communicate with one another. The terminals (**10***da*, **10***db*, . . .), the relay device **30***d*, and the router **70***d* are connected via the LAN **2***d* such that they communicate with one another. The external input apparatuses (**40***da*, **40***db*, . . .) are connected to the terminals (**10***da*, **10***db*, . . .), respectively, such that they communicate with one another. Further, the LAN **2***c* and LAN **2***d* are connected to the dedicated line **2***cd* including the router **70***cd* such that they communicate with each other within a predetermined region B. For example, the region B may be the United States of America (the USA), and the LAN **2***c* is installed within the New York office whereas the LAN **2***d* is installed within Washington, D.C. office, as already described above. The region A and the region B are connected such that they communicate with each other from the respective routers (**70***ab* and **70***cd*) via the Internet **2***i*. Further, the transmission management system **50** and the fee management system **60** are connected via the dedicated line **2***x* such that they communicate with each other.

Moreover, the transmission management system **50**, the fee management system **60**, the program providing system **90**, and the maintenance system **100** are connected to the terminal **10** and the relay device **30** via the Internet **2***i* such that they communicate with one another. The transmission management system **50**, the fee management system **60**, the program providing system **90**, and the maintenance system **100** may be installed in the region A or region B, or may be installed in a region other than regions A and B.

Note that in this embodiment, the communications network **2** is formed of the LAN **2***a*, the LAN **2***b*, the dedicated line **2***ab*, the Internet **2***i*, the dedicated line **2***cd*, the dedicated line **2***x*, the LAN **2***c*, and the LAN **2***d*. The communications network **2** not only includes areas where wired communications are performed but also includes areas where wireless communications such as wireless fidelity (WiFi) or Bluetooth (registered trademark) are performed.

Moreover, in FIG. **1**, a typical IPv4 address is simply represented by a combination of four digits that is noted beneath each of the terminals **10**, the relay devices **30**, the transmission management system **50**, the fee management system **60**, the routers **70**, the program providing system **90**, and the maintenance system **100**. The combination of four digits illustrated beneath the fee management system **60** simply represents the IPv4 address in the communications management server **510**. For example, the terminal **10***aa* is "1.2.1.3". The IPv6 may be used in place of the IPv4; however, the IPv4 alone is employed for simplifying illustration of the embodiments.

Note that each of the terminals **10** may be used not only for communications between plural offices but for communications between different rooms within the same office, communications between individuals within the same room, or communications between those inside the building and those outside the building. When the terminals **10** are used outside the building, wireless communications such as a mobile phone communications network are used.

Hardware Configuration of Embodiment

Initially, a hardware configuration according to an embodiment is described.

FIG. **4** is a hardware configuration diagram illustrating the terminal **10** according to an embodiment. As illustrated in FIG. **4**, the terminal **10** of the embodiment includes a central processing unit (CPU) **101** configured to control overall operations of the terminal **10**; a read-only memory (ROM) **102** configured to store programs used to drive the CPU **101** such as an initial program loader (IPL); a random access memory (RAM) **103** configured to be used as a work area of the CPU **101**; a flash memory **104** configured to store terminal programs, and various types of data including image data and audio data; a solid state drive (SSD) **105** configured to control reading or writing of various types of data with respect to the flash memory **104** under control of the CPU **101**; a media drive **107** configured to control reading or wiring (storing) data with respect to a recording medium **106** such as flash memory; an operations button **108** configured to be operated when an address of the terminal **10** is selected; a power switch **109** configured to switch ON or OFF of the power of the terminal **10**; and a network interface (I/F) **111** configured to transmit data via the communications network **2**.

The terminal **10** is configured to further include a built-in camera **112** configured to image a subject to obtain image data under control of the CPU **101**; an imaging element I/F **113** configured to control driving of the camera **112**; a microphone **114** configured to input sound and voice; a speaker **115** configured to output sound and voice; an audio input-output I/F **116** configured to process input and output of audio signals between the microphone **114** and the speaker **115** under control of the CPU **101**; a display I/F **117** configured to transmit image data to an external display **120** under control of the CPU **101**; an external apparatus connecting I/F **118** configured to connect various types of apparatuses; an alarm lamp **119** configured to alert malfunctioning of various types of functions of the terminal **10**; and a bus line **110** such as an address bus or a data bus configured to electrically connect the above-described components as illustrated in FIG. **4**.

The display **120** serves as a display part composed of liquid crystal or organic electroluminescence (EL) configured to display an image of a subject or operations icons. The display **120** is connected to the display I/F **117** with a cable **120***c*. The cable **120***c* may be an analog RGB (video graphics array (VGA)) signal cable, a component video cable, a high-definition multimedia interface (HDMI) cable or a digital video interactive (DVI) signal cable.

The camera **112** includes lenses, and a solid-state imaging element configured to convert light into electric charges to electronically convert an image (video) of a subject. The camera **112** employs a complementary metal oxide semiconductor (CMOS) or a charge coupled device (CCD) as the solid-state imaging element.

The external apparatus connecting I/F **118** may be a universal serial bus (USB) cable or the like inserted in a not-illustrated connecting port of a not-illustrated housing of the terminal **10**, via which an external camera, an external microphone, and an external speaker may be electrically connected. When the external camera is connected, the external camera is configured to be driven in priority to the built-in camera **112** under control of the CPU **101**. Likewise, when the external microphone or the external speaker is connected, the external microphone or the external speaker is configured to be driven in priority to the built-in microphone **114** or the built-in speaker **115**, respectively, under control of the CPU **101**.

Note that the recording medium **106** is configured to be removable with respect to the terminal **10**. Further, the recording medium **106** is not limited to the flash memory **104**, but may be any nonvolatile memory such as an electrically erasable and programmable ROM (EEPROM), from which data are read or on which data are written under control of the CPU **101**.

Note that the terminal **10** is only an example, and may be a general-purpose personal computer (PC), a smart phone, a tablet terminal, or a mobile phone. Note also that the camera **112**, the microphone **114**, and the speaker **115** are not necessarily built-in types, and may be externally connected.

Further, the above-described terminal programs may be recorded as files in an installable format or executable format. The terminal programs may be recorded and distributed in a computer-readable recording medium (e.g., the recording medium **106**). Moreover, the terminal programs may be stored in the ROM **102** instead of the flash memory **104**.

FIG. **5** is a hardware configuration diagram illustrating the transmission management system **50** according to an embodiment. The transmission management system **50** includes a central processing unit (CPU) **201** configured to control overall operations of the transmission management system **50**; a read-only memory (ROM) **202** configured to store programs used to drive the CPU **201** such as an initial program loader (IPL); a random access memory (RAM) **203** configured to be used as a work area of the CPU **201**; a hard disk (HD) **204** configured to store transmission management

programs, and various types of data; a hard disk drive (HDD) **205** configured to control reading or writing of various types of data with respect to the HD **204** under control of the CPU **201**; a media drive **207** configured to control reading or wiring (storing) data with respect to a recording medium **206** such as flash memory; a display **208** configured to display various types of information such as a cursor, menus, windows, characters, or images; a network interface I/F **209** configured to transmit data via the communications network **2**; a keyboard **211** configured to include plural keys for inputting characters, numerical values, various and instructions; a mouse **212** configured to execute various instructions, select a process target, or move the cursor; a CD-ROM drive **214** configured to control reading or writing various types of data with respect to a compact disc read-only memory (CD-ROM) **213** serving as an example of a removable recording medium; and a bus line **210** such as an address bus or a data bus configured to electrically connect the above-described components as illustrated in FIG. **5**.

Note that the above-described transmission management programs may be recorded as files in an installable format or executable format. The transmission management programs may be recorded and distributed in a computer-readable recording medium such as the recording medium **206** or the CD-ROM **213**. Moreover, the transmission management programs may be stored in the ROM **202** instead of the HD **204**.

Further, the relay device **30** has a similar hardware configuration as that of the transmission management system **50**, and hence, the description of the hardware configuration of the relay device **30** is omitted from the specification. However, the HD **204** of the relay device **30** records relay device programs configured to control the relay device **30**. In this case, the relay device programs may be recorded as files in an installable format or executable format. The relay device programs may be recorded and distributed in a computer-readable recording medium such as the recording medium **206** or the CD-ROM **213**. Further, the relay device programs may be stored in the ROM **202** instead of the HD **204**.

Further, the external input apparatus **40** has a similar hardware configuration as that of the transmission management system **50**, and hence, the description of the hardware configuration of the external input apparatus **40** is omitted from the specification. However, the HD **204** of the external input apparatus **40** records external input apparatus programs configured to control the external input apparatus **40**. In this case, the external input apparatus programs may be recorded as files in an installable format or executable format. The external input apparatus programs may be recorded and distributed in a computer-readable recording medium such as the recording medium **206** or the CD-ROM **213**. Moreover, the above-described external input apparatus programs may be stored in the ROM **202** instead of the HD **204**.

Further, the program providing system **90** has a similar hardware configuration as that of the transmission management system **50**, and hence, the description of the hardware configuration of the program providing system **90** is omitted from the specification. However, the HD **204** of the program providing system **90** records program providing programs configured to control the program providing system **90**. In this case, the program providing programs may be recorded as files in an installable format or executable format. The program providing programs may be recorded and distributed in a computer-readable recording medium such as the recording medium **206** or the CD-ROM **213**. Moreover, the above-described program providing programs may be stored in the ROM **202** instead of the HD **204**.

Further, the maintenance system **100** has a similar hardware configuration as that of the transmission management system **50**, and hence, the description of the hardware configuration of the maintenance system **100** is omitted from the specification. However, the HD **204** of the maintenance system **100** records maintenance programs configured to control the maintenance system **100**. In this case, the maintenance programs may be recorded as files in an installable format or executable format. The maintenance programs may be recorded and distributed in a computer-readable recording medium such as the recording medium **206** or the CD-ROM **213**. Further, the maintenance programs may be stored in the ROM **202** instead of the HD **204**.

Note that the relay device programs may be recorded and distributed in a computer-readable recording medium such as a compact disc recordable (CD-R), a digital versatile disk (DVD), or a Blu-ray (registered trademark) disc (BD) serving as another example of the removable recording medium.

Functional Configuration of Embodiment

Next, a description is given of the terminal **10**, the transmission management system **50**, and the fee management system **60** of the embodiment. Note that illustration of functional configurations of the relay device **30**, the external input apparatus **10**, the router **70**, the program providing system **90**, and the maintenance system **100** is omitted from the specification.

Transmission Terminal

FIG. **6** is a functional block diagram illustrating the terminal **10** of an embodiment. As illustrated in FIG. **6**, the terminal **10** is configured to include a transmitting-receiving part **11**, an operations input receiver **12**, an audio input-output part **13**, an imaging part **14**, an image display controller **15**, a conversation quality determining part **16**, and a history information generator **17**.

The above-described parts may be functions or units to function that may be implemented by causing any of the components illustrated in FIG. **4** to operate based on the instructions from the CPU **101** in compliance with the terminal programs deployed in the RAM **103** from the flash memory **104**.

The transmitting-receiving part **11** is implemented by the instructions from the CPU **101** and the network I/F **111** illustrated in FIG. **4**, and configured to transmit to and receive from other terminals, apparatuses or systems various data or information via the communications network **2**.

The operations input receiver **12** is implemented by instructions from the CPU **101**, the operations button **108** and the power switch **109** illustrated in FIG. **4**, and configured to receive various types of inputs from a user. For example, when the user switches ON the power switch **109**, the operations input receiver **12** receives the user's switching ON operation to switch ON the power of the terminal **10**.

The audio input-output part **13** is implemented by the instructions from the CPU **101**, and the audio input-output I/F **116** illustrated in FIG. **4**. The microphone **114** converts the user's voice into audio signals, and the audio input-output part **13** then inputs audio data associated with the audio signals. Further, the audio input-output part **13** outputs the audio signals associated with the audio data to the speaker **115**, and causes the speaker **115** to output the voice.

The imaging part **14** is implemented by instructions from the CPU **101**, the camera **112** and the imaging element I/F **113** illustrated in FIG. **4**, and configured to image a subject and output the image data of the imaged subject.

The display controller **15** is implemented by instructions from the CPU **101**, and the display I/F **117** illustrated in FIG. **4**, and configured to control transmission of the image data to be displayed to the display **120**.

The conversation quality determining part **16** is configured to determine a conversation quality. The conversation quality indicates a quality of a conversational communications service provided by the transmission system (or the transmission management system **50**) while the user is engaged in conversation. Hence, the user having a comfortable conversation indicates that that the user is provided with a high conversation quality, whereas the user having a uncomfortable conversation indicates that that the user is provided with a low conversation quality.

For example, in a case of the communications service employing the Internet network or the mobile phone network, the voice or sound may be interrupted (sound interruption), video images may be skipped (image skipping) in a video conference, or resolution of the video images may be drastically lowered, due to degradation of such networks. As described above, the conversation quality may be affected by transmitting or receiving quality of the audio data and image data. Hence, when the user has a conversation (in a conference) being provided with high resolution video images without sound interruption and image skipping, the conversation quality determining part **16** determines that the user is provided with a high conversation quality. On the other hand, when the user has a conversation (in a conference) being provided with low resolution video images with sound interruption and image skipping, the conversation quality determining part **16** determines that the user is provided with a low conversation quality.

Note that the conversation quality may be represented by scores, numerical values, ranking evaluation (e.g., A, B, and C), or the like based on a predetermined standard. Alternatively, the conversation quality may, for example, be represented by percentage computed as follows. That is, the mean resolution (640×480=307200 dots) received by the terminal **10** during conversation may be divided by a standard resolution (640×480) determined by the service. Further, the conversation quality may, for example, be represented by the transmitted mean resolution or the mean received frame rate. Moreover, the conversation quality may, for example, be represented by the number of observations of sound interruption or image skipping, or a compound value computed based on the observations of the sound interruption or image skipping. In this embodiment, the scores from 0 to 100 may be employed for simplifying the description.

The history information generator **17** is configured to generate history information (log information) associated with a communications status of each of the terminals **10**. The generated history information may be transmitted to the transmission management system **50** when the communication status is changed. Note that the transmitted history information corresponds to the raw history information illustrated in FIG. **9**.

Note that the generated history information includes conversation quality values (e.g., scores). Note that the conversation quality indicates a quality of conversation in communications every time the communications implementing a conference are completed. Hence, the conversation quality value is determined when the communications status indicates the end of the conference (e.g., when the communications status is "leave" or "offline"), and the determined conversation quality value is input into a "conversation quality" field within the history information.

Transmission Management System

FIG. **7** is a functional block diagram illustrating the transmission management system **50** of an embodiment. As illustrated in FIG. **7**, the transmission management system **50** includes a communications management server **510**; a temporary storage server **520**; plural process servers (**5301**, **5302**, . . . , **530**N) (N represents an integer); a history information management server **540**; a terminal setting utility server **550**; a charge history creating server **560**; and a file transfer server **570**. The above-described servers are connected to one another via a LAN **590** such that the servers communicate with one another, while the servers are connected to the Internet **2***i* via the LAN **590**.

Note that each of the servers forming the transmission management system **50** has a similar hardware configuration as that of the transmission management system **50**, and hence, the description of the hardware configurations of the servers is omitted from the specification. Further, any of the process servers (**5301**, **5302**, . . . , **530**N) may be represented by the "process server **530**". Further, the file transfer server **570** is also connected to the dedicated line **2***x*.

Communications Management Server

Subsequently, a description is given of featured functions of the communications management server **510**. The communications management server **510** is configured to include a transmitting-receiving part **511**, and a communications controller **512**.

The transmitting-receiving part **511** is a function or a unit that may be implemented by instructions from the CPU **201**, and the network I/F **209** illustrated in FIG. **5**. The transmitting-receiving part **511** is configured to transmit to and receive from other terminals, apparatuses or systems various data or information via the communications network **2** including the LAN **590**, and the Internet **2***i*. For example, the transmitting-receiving part **511** may receive raw history information indicating a history associated with communications performed in each of the terminals **10** from the corresponding terminal **10** via the Internet **2***i* and the LAN **590**.

Note that the raw history information is information indicating a history (log) associated with the communications status of each of the terminals **10**. That is, the raw history information is raw information before a later-described process is being performed. FIG. **9** illustrates an example of a raw history information group. Each of the raw history information items is represented per schema record illustrated in FIG. **9**. Each of the raw history information items is formed of attributes including a communications status, a request source terminal ID, a destination terminal ID, a session IF, a conference ID, a conference session ID, communications date and time, and a conversation quality.

Among these attributes, the attribute "communications status" represents one of types of the communications contents of the terminal **10**. Further, among these communication statuses, the communications status "online" represents an ON status of the power of the terminal **10**. The communications status "offline" represents an OFF status of the power of the terminal **10**. Note that when the communications status is switched to "offline" during the conference, respective values are stored in the fields of the conference ID and the conference session ID. The communications status "invite" represents an invitation request for being invited to the conference. The communications status "call" represents an attending request for attending the conference being held. The communications status "accept" represents a permission to the invitation request (invite) or the attending request (call). The commu-

nications status "start" represents an initiation of the conference. The communications status "end" represents an end of the conference. The communications status "join" represents the terminal **10** attending the conference. The communications status "leave" represents the terminal **10** exiting from the conference.

Further, the attribute "request source terminal ID" represents identification (ID) for identifying the request source terminal as an example of request source terminal identification information. Moreover, the attribute "destination terminal ID" represents identification (ID) for identifying the destination terminal as an example of destination terminal identification information. Moreover, the attribute "session ID" represents identification (ID) for identifying a session from online to offline. Further, the attribute "conference ID" represents identification (ID) for identifying a conference. Moreover, the attribute "conference session ID" represents identification (ID) for identifying a conference session from the terminal **10** attending the conference to the terminal **10** exiting from the conference. For example, when the terminal **10** attends the same conference or exits from the same conference two or more times with time intervals, the conference session ID has a difference value each time the terminal **10** attends the conference or exits from the same conference. Further, the attribute "communications date and time" represent date and time of communications performed by the terminal **10** with the above-described communications statuses.

The attribute "conversation quality" indicates degrees of quality of the conversation held in the conference communications when the conference utilizing the terminal **10** has completed. In this embodiment, the "conversation quality" is evaluated by the scores from 0 to 100. For example, when the "conversation quality" is a score of 100, audio data and image data communications are provided with the highest communications status during the conference, which indicates that the highest quality conversation is provided in the conference communications.

Note that the above-described attributes and the communications statuses are only examples, and may include other data items and values. Further, in this example, each of the attributes is clearly defined such as a database (DB) table. However, the raw history information may include various items, and hence, the raw history information may be configured to include text data items alone such as JavaScript Object Notation (JSON), and extensible markup language (XML).

The display controller **512** is a function or a unit that may be implemented by instructions from the CPU **201** illustrated in FIG. **5**, and configured to perform control in association with communications executed between the transmitting-receiving part **511** and each of the terminals **10** based on the management information session sei illustrated in FIG. **2**. For example, the communications controller **512** performs management of the communications with each of the terminals, control and management for receiving the raw history information from each of the terminals **10**, and control and management for transmitting later described process history information to the terminal **10** that has requested acquiring the process history information. Note that the terminal **10** that has requested acquiring the process history information is referred to as the "acquisition request source terminal".

Temporary Storage Server

Next, a description is given of featured functions of the temporary storage server **520**. The temporary storage server **520** is configured to include a transmitting-receiving part **521**, and a temporary storage part **529**.

The transmitting-receiving part **521** is a function or a unit that may be implemented by instructions from the CPU **201**, and the network I/F **209** illustrated in FIG. **5**. The transmitting-receiving part **521** is configured to transmit to or receive from other servers various types of data (or information) via the LAN **590**. For example, the transmitting-receiving part **521** may receive raw history information indicating a history associated with communications in each of the terminals **10** from the transmitting-receiving part **521** of the communications management server **510** via the LAN **590**.

Further, the transmitting-receiving part **521** transmits raw history information stored in the temporary storage part **529** to the process server **530** via the LAN **590**. The transmitting-receiving part **521** receives the raw history information returned from the process server **530**.

Further, the temporary storage part **529** is composed of the HD **204** and the HDD **205** illustrated in FIG. **5**. The temporary storage part **529** is configured to temporarily store the raw history information received by the transmitting-receiving part **511**, and read the already stored raw history information to the transmitting-receiving part.

Process Server

Next, a description is given of featured functions of the process server **530**. FIG. **8** is a schematic diagram illustrating a process rule management table. FIG. **9** is a schematic diagram illustrating raw history information. FIG. **10**A is a schematic diagram illustrating an attendee history management table. FIG. **10**B is a schematic diagram illustrating a conference history management table. In the present embodiment, the temporary storage server **520** and the process server **530** are separately constructed, which enables the transmission management system **50** to receive the raw history information until the end of a process carried out by the process server **530**. Further, there are plural process servers **530** in the transmission management system **50**. Hence, plural sets of the raw history information may be distributed to these process servers **530** to separately process the respective sets of the raw history information, which may distribute the process load between these process servers **530**.

The process server **530** is configured to include a transmitting-receiving part **531**, a process part **532**, and a process rule management part **539**. The transmitting-receiving part **531** is a function or a unit that may be implemented by instructions from the CPU **201**, and the network I/F **209** illustrated in FIG. **5**.

The transmitting-receiving part **531** is configured to transmit to or receive from other servers various types of data (or information) via the LAN **590**.

The process rule management part **539** is composed of the HD **204** and the HDD **205** illustrated in FIG. **5**. The process rule management part **539** is composed of a process rule management table (T) in which communications status information indicating a communication status of a predetermined terminal **10** is associated with process contents information indicating the contents of the process. The process rule management table (T) is configured to include the attributes (fields) including a process start requirement, a post-process target table, a post-process target record, and process contents as illustrated in FIG. **8**.

The attribute "process start requirement" indicates a requirement for the process part to start processing based on the process contents. The process start requirement may differ based on the "communications status", the "conference ID", and the "conference session ID".

The attribute "post-process target table" indicates one of the post-process tables (t1, and t2) illustrated in FIGS. **10**A and **10**B. The attribute "post-process target record" indicates a predetermined one of records of the post-process tables (t1, and t2) illustrated in FIGS. **10**A and **10**B.

Further, the attribute "process contents" indicates contents of a process in which the process part **532** performs a process on the raw history information to form process history information by associating a specific one of items of the raw history information with a corresponding one of items of the process history information.

Note that when there is no post-process target record in the process rule management table (T), the process part **532** newly creates records corresponding to the post-process tables (t1, and t2).

Further, when values are already entered in all the items subject to processing at the time of performing the process, the process part **532** does not perform any process. When no process start requirement (communication status) is applicable, the process part **532** does not perform any process. When values are not entered in the start date and time or the end date and time of any terminal **10** in the raw history information at the time of updating the conference hours, the process part **532** does not perform any process. When values are not entered in the attending date and time or the exit date and time of any terminal **10** in the raw history information at the time of updating the attending hours, the process part **532** does not perform any process.

Note that the above-described process rule is only an example, and a process rule differing from the above-described process rule may be defined. Alternatively, the process rule may be defined by a program representing the process rule without using the process rule management table (T) so that the process is performed based on the process rule program.

The process part **532** is a function or a unit that may be implemented by instructions from the CPU **201** illustrated in FIG. **5**, and configured to perform various types of processes such as creating process history information indicating a post-process history by carrying out a predetermined process with respect to the raw history information.

As an example of various types of processes, the process part **532** may determine whether raw history information is stored in the temporary storage part **529** via the transmitting-receiving part **531**, the LAN **590**, and the transmitting-receiving part **521**. Further, the process part **532** searches the process rule management table (T) for communication status information indicating the communication status contained in the raw history information received by the transmitting-receiving part **531** as a search key to extract a corresponding process information. Further, the process part **532** performs a process on the received raw history information in compliance with the process contents indicated by the extracted process information to create process history information indicating a post-process history.

The process part **532** stores the process history information create by the process part **532** in the process history part **547** of the later-described history management server **540** via the transmitting-receiving part **531** and the LAN **590**. Further, the process part **532** stores the raw history information in a raw history part **548** of the history management server **540** via the transmitting-receiving part **531**, and the LAN **590**, regardless of the raw history information being processed or unprocessed. However, when the process history storage part **547** and the raw history storage part **548** fail to store the process history information, the process part **532** returns the raw history information before being processed to the temporary storage part **529** of the temporary storage server **520** via the transmitting-receiving part **531**, the LAN **590**, and the transmitting-receiving part **521**.

When the raw history information has deficiency (e) due to missing information of the predetermined item of the raw history information, and the process part **532** fails to perform process on the raw history information, the process part **532** stores the raw history information having the deficiency (e) in a deficiency raw history storage part **549** of the history management server **540** via the transmitting-receiving part **531** and the LAN **590**.

History Management Server

Next, a description is given of featured functions of a history management server **540**. The history management server **540** is configured to include a transmitting-receiving part **541**, a search part **542**, a deficiency history excluding part **543**, a process history storage part **547**, the raw history storage part **548**, and the deficiency raw history storage part **549**.

The transmitting-receiving part **541** is a function or a unit that may be implemented by instructions from the CPU **201**, and the network I/F **209** illustrated in FIG. **5**. The transmitting-receiving part **541** is configured to transmit to or receive from other servers various types of data (or information) via the LAN **590**.

The search part **542** searches the process history storage part **547** for the process history information corresponding to the acquisition request, and extracts the process history information corresponding to the acquisition request.

The deficiency history excluding part **543** is a function or a unit that may be implemented by instructions from the CPU **201** illustrated in FIG. **5**. When the deficiency history excluding part **543** receives an acquisition request for acquiring the process history information from the external input apparatus **40** connected to the acquisition request source terminal, the deficiency history excluding part **543** checks whether there is deficiency (E) due to missing information of the predetermined items in each of the acquisition requested process history information sets stored in the process history storage part **547**. When the deficiency history excluding part **543** detects the deficiency (E) in the process history information, the deficiency history excluding part **543** excludes such process history information having the deficiency (E).

Note that when the temporary storage part **529** stores the raw history information in the order of sequential receipt from the terminals **10**, the process history information will not have deficiency (E). However, an asynchronous process of the temporary storage part **529** may disturb the temporary storage part **529** from storing the raw history information in the order of sequential receipt from the terminals **10**. As a result, the raw history information is not necessarily stored in the order of sequential transmission from each of the terminals **10**. Further, as illustrated in this embodiment, when there are process servers **530**, even though the raw history information transmitted from each of the terminals **10** is sequentially stored in the temporary storage part **529** in the transmitted order, the process is not necessarily performed on the raw history information in the order of being transmitted from the terminals **10**. Thus, the process history information having deficiency (E) may be provided owing to the timing of acquisition requests from the acquisition request source terminal. Hence, the deficiency history excluding part **543** of the embodiment is configured to check whether the process history information has deficiency (E) in advance before providing the acquisition request source terminal with the process history information.

Next, the process history storage part **547** stores the process history information created by the process part **532** of each of the process servers **530**. The process history information is, as illustrated in FIG. **10**A, managed as the attendee history management table (t**1**), and is also, as illustrated in FIG. **10**B, the conference history management table (t**2**).

The attendee history management table (t**1**) is, as illustrated in FIG. **10**A, configured to include attributes including a history ID, a terminal ID, a conference ID, a conference session ID, attending date and time, exit date and time, attending hours, an exit status, and a conversation quality. Among these attributes, the attribute "history ID" represents identification (ID) for specifically identifying an attendee at a conference. The attribute "terminal ID" represents identification (ID) for specifically identifying a terminal attending the conference as an example of terminal identification information. The attribute "conference ID" represents identification (ID) for specifically identifying a conference which the attendee or the terminal **10** has attended.

Further, the attribute "conference session ID" represents identification (ID) for specifically identifying a conference session seim serving as an example of session sei from the terminal **10** attending (join) the conference to the terminal **10** exiting (leave) from the conference. For example, when a certain terminal **10** repeatedly attends the same conference or exits from the same conference two or more times with time intervals, the conference session ID has a difference value each time the terminal **10** attends the same conference or exits from the same conference.

Further, the attribute "attending date and time" represents date and time at which the terminal **10** has attended the conference. The attribute "exit date and time" represents date and time at which the terminal **10** has exited from the conference. The attribute "attending hours" represents a period of time (hours) from the time at which the terminal **10** has attended the conference to the time at which the terminal **10** has exited from the conference.

The attribute the "conversation quality" represents degrees of a conversation quality in the corresponding conference communications at the time where the terminal **10** has completed the conference.

Further, the attribute "exit status" represents a status in which the terminal **10** has exited from the conference. The exit status "exit" indicates a status in which the terminal **10** has normally exited from the conference. The exit status "forced termination" indicates a status in which the terminal **10** has forcibly been terminated due to power off. The exit status "conference in progress" indicates a status in which the terminal **10** is currently attending the conference.

Note that the above-described attributes and the exit statuses of the attendee history management table (t**1**) are only examples, and may include other data items and values.

Next, the conference history management table (t**2**) is, as illustrated in FIG. **10**B, configured to include attributes including a conference ID, an organizer terminal ID, start date and time, end date and time, and conference hours. Among these attributes, the attribute "conference ID" represents identification (ID) for specifically identifying a conference. The attribute "organizer terminal ID" represents identification (ID) for specifically identifying a terminal serving as an organizer of the conference. For example, the organizer of the conference represents an organizer of a conference which three attendees are expected to attend. One of the attendees may attend or exit from the conference immediately after the conference has started. The above attendee's attending or exiting from the conference is indicated in the attendee history management table (t**1**).

Further, the attribute "start date and time" represents date and time at which an entire conference has started. The attribute status "end date and time" represents date and time at which the entire conference has ended. The attribute status "conference hours" represents a period of time (hours) in which the entire conference has been held.

Note that the above-described attributes of the conference history management table (t**2**) are only examples, and may include other data items and values.

Further, in the present embodiment, one of the process history storage parts **547** may store the above-described two tables (t**1** and t**2**). However, the present embodiment is not limited to such a configuration, and a database (DB) may be constructed corresponding to each of the two tables (t**1** and t**2**).

Next, referring back to FIG. **7**, the raw history storage part **548** stores the raw history information stored in the temporary storage part **529** as it is for a long-term storage as master data. Hence, the raw history information stored as the master data may be able to use when any failure has occurred in the transmission system **1**.

When the raw history information has deficiency (e) due to missing information of the predetermined item of the raw history information, and the process part **549** fails to perform process on the raw history information, the deficiency raw history storage part **549** stores the raw history information having the deficiency (e).

Terminal Setting Utility Server

Next, a description is given of featured functions of the terminal setting utility server **550**. The terminal setting utility server **550** represents a server that receives an acquisition request for acquiring the process history information from the acquisition request source terminal and transmits the process history information to the terminal **10**. The terminal setting utility server **550** is configured to include a transmitting-receiving part **551**, and an auxiliary function part **552**.

The transmitting-receiving part **551** is a function or a unit that may be implemented by instructions from the CPU **201**, and the network I/F **209** illustrated in FIG. **5**. The transmitting-receiving part **551** serves as an interface for receiving an acquisition request for acquiring the process history information from the acquisition request source terminal and transmitting the process history information to the acquisition request source terminal. The auxiliary function part **552** is a function or a unit that may be implemented by instructions from the CPU **201** illustrated in FIG. **5**. The auxiliary function part **552** is configured to execute various types of auxiliary functions excluding functions such as the acquisition of the raw history data or communications control.

Charge History Creating Server

Next, a description is given of featured functions of the charge history creating server **560**. The charge history creating server **560** is configured to create a charge history for charging a user a usage fee for his/her using the transmission system **1**. The charge history creating server **560** is configured to include a transmitting-receiving part **561**, and a charge history creating part **562**.

The transmitting-receiving part **561** is a function or a unit that may be implemented by instructions from the CPU **201**, and the network I/F **209** illustrated in FIG. **5**. The transmitting-receiving part **561** is configured to request the history management server **540** to acquire attending hours information (pi) and conversation quality information (si) via the LAN **590**. The attending hours information (pi) indicates the

"attending hours" in a predetermined period indicated by the "attending date and time" and the "exit date and time" (e.g., a period from Sep. 1, 2010 to Sep. 30, 2010). The conversation quality information (si) indicates the "conversation quality".

Further, the transmitting-receiving part **561** is configured to acquire desired attending hours information (pi) and conversation quality information (si) from the history management server **540**. In addition, the transmitting-receiving part **561** is configured to transmit later-described charge history information (i) created by the charge history creating part **562** to the file transfer server **570**.

The charge history creating part **562** is a function or a unit that may be implemented by instructions from the CPU **201** illustrated in FIG. **5**. The charge history creating part **562** is configured to create charge history information (i) formed of a comma separated values (CSV) file based on the attending hours information (pi), and the conversation quality information (si) acquired by the transmitting-receiving part **561**.

File Transfer Server

Next, a description is given of featured functions of the file transfer server **570**. The file transfer server **570** is connected to a later-described file transfer server **610** in the fee management system **60** via the dedicated line **2***x*. Hence, the transmission management system **50** may be able to transfer an electronic file to the fee management system **60** via the dedicated line **2***x* without passing through the Internet **2***i*, which may prevent fees from being tampered with.

The file transfer server **570** is configured to include a transmitting-receiving part **571**, and a communications controller **572**. The transmitting-receiving part **571** is a function or a unit that may be implemented by instructions from the CPU **201**, and the network I/F **209** illustrated in FIG. **5**. The transmitting-receiving part **571** is configured to receive the charge history information (i) including the attending hours information (pi) and the conversation quality information (si) transmitted from the charge history creating server **560**, and transfer the charge history information (i) to the later-described file transfer server **610** in the fee management system **60** via the dedicated line **2***x*. Further, the communications controller **572** is a function or a unit that may be implemented by instructions from the CPU **201** illustrated in FIG. **5**, and configured to control information (data) transmission and reception of the transmitting-receiving part **571**.

Fee Management System

FIG. **11** is a functional block diagram illustrating a fee management system **60** of an embodiment. As illustrated in FIG. **11**, the fee management system **60** includes the file transfer server **610**, and the fee computing server **620**. The above-described servers are connected to each other via the LAN **690** such that the servers communicate with each other while the servers are connected to the Internet **2***i* via the LAN **690**. Further, the file transfer server **610** is also connected to the dedicated line **2***x*. Note that each of the servers forming the fee management system **60** has a similar hardware configuration as that of the transmission management system **50**, and hence, the description of the hardware configurations of the servers is omitted from the specification.

File Transfer Server

Next, a description is given of featured functions of the file transfer server **610**. The file transfer server **610** is connected to the file transfer server **570** in the transmission management system **50** via the dedicated line **2***x*. Hence, the fee management system **60** may be able to receive an electronic file from the transmission management system **50** via the dedicated line **2***x* without being passed through the Internet **2***i*.

The file transfer server **610** is configured to include a transmitting-receiving part **612**, and a communications controller **611**. The transmitting-receiving part **612** is a function or a unit that may be implemented by instructions from the CPU **201**, and the network I/F **209** illustrated in FIG. **5**. The transmitting-receiving part **612** is configured to receive the charge history information (i) transmitted as an electronic file from the file transfer server **570** of the transmission management system **50** via the dedicated line **2***x*, and transfer the charge history information (i) to the fee computing server **620** via the LAN **690**. Further, the communications controller **611** is a function or a unit that may be implemented by instructions from the CPU **201** illustrated in FIG. **5**, and configured to control information (data) transmission and reception of the transmitting-receiving part **612**.

Fee Computing Server

Next, a description is given of featured functions of the fee computing server **620**. The fee computing server **620** is configured to include a transmitting-receiving part **621**, a computing part **622**, a charge part **623**, and a user management part **629**.

The user management part **629** is composed of the HD **204** and the HDD **205** illustrated in FIG. **5**. The user management part **629** is formed of a user management table (Ty). The user management table (Ty) is configured to include attributes (fields) including a contract number of a user, a user ID, a user name, a user address, a user phone number, a user email address, and a terminal ID that are associated with one another as illustrated in FIG. **12**. Note that the contract number of the user, the user ID, the user name, the user address, the user phone number, and the user email address may be used alone or a combination of two or more as user identification information for identifying the user.

The attribute "contract number" is an identification number of a contract when the contract is exchanged between the administrator of the transmission system **1** and each of the users in order for each user to use the transmission system **1**.

The attribute "user ID" represents user identification information composed of an identifier and the like for specifically identifying a user.

The attribute "user name" represents information indicating a title or a name of a user. The attribute "user address" represents information indicating an address or a residence of a user, an example of which may be an installation site of the terminal **20**.

The attribute "user phone number" represents information indicating a phone number of a user. The attribute "user mail address" represents information indicating an electronic mail address of the terminal **20**.

The attribute "terminal ID" is an example of terminal identification information, which represents information indicating terminal identification (ID) of all the terminals **10** held by the user for specifically identifying a terminal attending the conference as an example of terminal identification information. For example, the user having the user ID "a123" has the terminals **10** represented by the terminal IDs "11001", "11002", "11003", and the like.

Further, the transmitting-receiving part **621** is a function or a unit that may be implemented by instructions from the CPU **201**, and the network I/F **209** illustrated in FIG. **5**. The transmitting-receiving part **621** is configured to transmit to

or receive from other terminals or systems various types of data (or information) via the Internet **2***i* and the communications network **2**.

The computing part **622** is a function or a unit that may be implemented by instructions from the CPU **201**, and the network I/F **209** illustrated in FIG. **5**. The computing part **622** is configured to compute a total attending fee for each of the users based on the charge history information (i) transferred from the file transfer server **610**. Further, the computing part **622** is configured to include an attending hours computing part **622***a*, a conversation quality computing part **622***b*, an attending fee computing part **622***c*, and an attending fee summing part **622***d*.

The attending hours computing part **622***a* is configured to refer to the attending history management table (t**1**) (see FIG. **10**A) stored in the process history storage part **547** of the transmission management system **50**, and compute a total attending hours for each of the terminals **10** within a predetermined period by summing up the attending hours values represented by the "attending hours" of a corresponding one of the terminal IDs within the predetermined period.

For example, in FIG. **10**A, the terminal ID "110001" is managed by the history IDs "001", and "005" within a predetermined period (e.g., a whole month of September, 2010) illustrated in FIG. **15**A. Hence, the total attending hours of the terminal **10** represented by the terminal ID "110001" may be computed by summing the attending hours "1 hr 30 min 25 s (01:30:25)", "1 hr 10 min 10 s (01:10:10)", and the like, respectively.

Further, the conversation quality computing part **622***b* is configured to refer to the attending history management table (t**1**) (see FIG. **10**A) stored in the process history storage part **547** of the transmission management system **50**, and acquire a conversation quality value for each of the terminals **10** within a predetermined period. The conversation quality computing part **622***b* is configured to further compute the average of the conversation quality values per unit time as an average conversation quality per unit time within the predetermined period. Note that the unit time is determined as "minute".

For example, in FIG. **10**A, the terminal ID "110001" is managed by the history IDs "001", and "005" within a predetermined period (e.g., a whole month of September, 2010) illustrated in FIG. **15**A. Among these, the conversation quality and the attending hours corresponding to the history ID "001" are "100" and "1 hr 30 min 25 s (01:30:25)" (approximately 90 m), respectively. Similarly, the conversation quality and the attending hours corresponding to the history ID "005" are "100" and "1 hr 10 min 10 s (01:10:10)" (approximately 70 m), respectively. In this case, the average conversation quality value per unit time is computed as $\{(90\times100)+(70\times80)\}/(90+70)=91.25$.

Further, the attending fee computing part **622***c* is configured to compute an attending fee for each of the terminals **10** within the predetermined period based on the total attending hours computed by the attending hours computing part **622***a* and the average conversation quality per unit time computed by the conversation quality computing part **622***b*.

For example, there is a case where the administrator determines an attending fee per minute being ten yen in advance. In this case, when the total attending hours of any one of the terminals **10** computed by the attending hours computing part **622***a* is 160 min, and the average conversation quality per unit time is 91, the attending fee may be computed as follows: $10\times160\times0.91=1456$ yen. Note that the conversation quality in this embodiment is evaluated by the scores from 0 to 100. Hence, when the average conversation quality value per unit time is 91, the ratio coefficient 0.91 is a multiplier. When the average conversation quality value per unit time is 100, the ratio coefficient 1 is a multiplier.

Further, the attending fee summing part **622***d* refers to the user management table (Ty) (see FIG. **12**) managed by the user management part **629**, and computes a total attending fee for each of the users by summing the attending fees (computed by the attending fee computing part **622***c*) of the terminals **10** represented by a corresponding one of the user IDs serving as charging destinations of the attending fees.

For example, as in FIG. **12**, the user having the user ID "a123" has the terminals represented by the terminal IDs "11001", "11002", "11003", and the like. Hence, the total attending fee for the user having the user ID "a123" may be computed by summing up the attending fees of the respective terminals **10** represented by the terminal IDs "11001", "11002", "11003", and the like computed by the attending fee computing part **622***c*.

Next, the charge part **623** is a function or a unit that may be implemented by instructions from the CPU **201**, and the network I/F **209** illustrated in FIG. **5**. The charge part **623** is configured to refer to the user management table (Ty) illustrated in FIG. **12**, and transmit attending fee charging information via electronic mail to a user mail address serving as an attending fee reporting destination from the transmitting-receiving part **621** via the communications network **2**. The attending fee charging information includes a total attending fee of all the terminals **10** held by the respective users within a predetermined period, attending year, date, and time, the person who charges the fee such as an administrator, a method of payment, an account number into which the attending fee is to be transferred, and the like.

Processes and Operations of Embodiment

Next, a description is given of a process in the transmission system **1** according to the embodiment by referring to FIGS. **1**, **7**, and **13**. FIG. **13** is a flowchart illustrating a process performed by the transmission management system in which raw history information is processed to create process history information.

In FIG. **1**, each of the terminals **10** is configured to transmit raw history information indicating a history associating with a communication status to the transmission management system **50** when the communication status is changed. Further, in FIG. **7**, the communications management server **510** of the transmission management system **50** is configured to receive the raw history information transmitted from each of the terminals **10** and store the received raw history information in the temporary storage server **520**. The transmitting-receiving part **521** of the temporary storage server **520** is configured to receive each of the raw history information sets transmitted from the communications management server **510**. The temporary storage part **529** is configured to store the raw history information received by the transmitting-receiving part **521**. With this configuration, the temporary storage part **529** is configured to sequentially store the raw history information. In the above configuration, a description is given, with reference to FIG. **13**, of a process performed by the transmission management system in which the raw history information is processed to create process history information. Note that the temporary storage server **520** may be configured to directly receive the raw history information from each of the terminals **10**.

FIG. **13** is a flowchart illustrating a process performed by the transmission management system in which raw history information is processed to create process history information.

Initially, the process part **532** of the process server **530** determines whether raw history information is stored in the temporary storage part **529** via the LAN **590** (step S**1**). Subsequently, when the process part **532** determines that the raw history information is NOT stored in the temporary storage part **529** ("NO" in step S**1**), the process part **532** repeatedly performs the process in step S**1**.

Next, the process part **532** retrieves the raw history information from the temporary storage part **529** via the LAN **590** (step S**2**).

Subsequently, the process part **532** determines whether the process part **532** is able to communicate with the raw history storage part **548** (step S**3**). When the process part **532** determines that the process part **532** is unable to communicate with the raw history storage part **548** ("NO" in step S**3**), the process part **532** returns the raw history information to the temporary storage part **529** via the LAN **590** (step S**4**). On the other hand, when the process part **532** determines that the process part **540** is able to communicate with the raw history storage part **548** ("YES" in step S**3**), the process part **532** stores the raw history information as master data in the raw history storage part **548** of the history management server **540** via the LAN **590** (step S**5**).

Next, the process part **532** searches the process rule management table (T) for the raw history information retrieved in step S**2** as a search key to extract process information corresponding to the retrieved raw history information, and creates process history information indicating a post-process history by carrying out a predetermined process on the raw history information based on the extracted process information (step S**6**). Note that in step S**6**, the predetermined process is not carried out on the raw history information having the communications status illustrated in FIG. **9** being "online" or "accept". This is because the process rule management table (T) illustrated in FIG. **8** does not include the communications status "online" or "accept" as the process start requirement. Further, the raw history information may include deficiency (e). In such a case, the raw history information does not appear to be processed normally by the process part **532**.

Subsequently, the process part **532** determines whether the process part **532** has successfully carried out the process on the raw history information based on the process contents in step S**6** (step S**7**). Subsequently, when the process part **532** determines that the process part **532** has failed to carry out the process on the raw history information ("NO" in step S**7**), the process part **532** further determines whether the reason for failing to carry out the process is failure to communicate with the process rule management part **539** (step S**8**).

Subsequently, when the process part **532** determines that the process part **532** is unable to communicate with the process rule management part **539** ("YES" in step S**8**), the process part **532** returns the raw history information to the temporary storage part **529** via the LAN **590** (step S**4**). On the other hand, when the process part **532** determines that the process part **540** is able to communicate with the process rule management part **539** ("NO" in step S**8**), the process part **532** stores the raw history information having the deficiency (e) in the deficiency raw history storage part **549** of the history management server **540** via the LAN **590** (step S**9**). Hence, the administrator of the transmission system **1** may be able to consider possible solutions by analyzing the raw history information having the deficiency (e).

Note that the process part **532** returns the raw history information to the temporary storage part **529** for the following reason. Even when the process server **530** is unable to communicate with a process record management part (DB), this communications failure may be considered as temporary database failure unlike failure in a communications network such as LAN. Hence, the raw history information may be stored in the temporary storage part **529** after the process record management part (DB) is restored. Thus, with the above configuration, since the raw history information is subject to processing again, the raw history information having no deficiency (e) may be prevented from failing to be processed.

Further, the process part **532** stores the raw history information in the deficiency raw history storage part **549** when access to the process rule management part **539** always results in errors; for example, when the raw history information has missing information that is necessary for the raw history information. In such a case, the raw history information having deficiency (e) is configured to be stored as an error log in the deficiency raw history storage part **549** instead of returning the raw history information to the temporary storage part **529**.

Further, the administrator of the transmission system **1** may be informed of occurrence of the deficiency (e) via electronic mail or the like, instead of, or in combination with returning the raw history information to the temporary storage part **529**, or storing the raw history information in the deficiency raw history storage part **549**. Hence, the administrator may be able to immediately detect or acknowledge the occurrence of the deficiency (e).

Next, returning back to step S**7**, when the process part **532** determines that the process part **532** successfully carries out the process on the raw history information ("YES" in step S**7**), the process part **532** further determines whether the process part **532** is able to communicate with the process history storage part **547** (step S**10**). Then, when the process part **532** determines that the process part **532** is unable to communicate with the process history storage part **547** ("NO" in step S**10**), the process part **532** returns the raw history information to the temporary storage part **529** via the LAN **590** (step S**4**). On the other hand, when the process part **532** determines that the process part **540** is able to communicate with the process history storage part **547** ("YES" in step S**10**), the process part **532** stores the process history information processed in step S**6** in the process history storage part **547** of the history management server **540** via the LAN **590** (step S**11**).

Next, after the processes performed in steps S**9** and S**11**, the process part **532** completely deletes the raw history information retrieved in step S**2** from the temporary storage part **529** of the temporary storage server **520** via the LAN **590** (step S**12**).

Next, after the processes performed in steps S**12** and S**4**, the process part **532** returns to the process in step S**1** to proceed with performing processes subsequent to the process in step S**1** on the next raw history information sequentially stored in the temporary storage part **529**.

Next, a description is given of a process in which the transmission management system **50** provides the acquisition requested process history information with the acquisition request source terminal when the user terminal **10** requests the transmission management system **50** to acquire process history information, with reference to FIGS. **7**, **14** to **16**.

FIG. **14** is a flowchart illustrating a process from receiving an acquisition request for acquiring process history information from a user of the terminal to providing the user with the process history information. FIG. **15**A is a diagram illustrating an acquisition target period of the process history

information. FIG. **15**B is a diagram illustrating search requirements for searching for raw history information. FIG. **16** is a diagram illustrating an example of a screen displayed on a display of an external input apparatus.

Initially, the transmitting-receiving part **551** of the terminal setting utility server **550** illustrated in FIG. **7** receives from the acquisition request source terminal an acquisition request indicating a request for acquiring process history information relating to the communications in the acquisition request source terminal via the communications network **2** (step S**21**). The acquisition request includes a terminal ID of the acquisition request source terminal, and the acquisition target period of the process history information (e.g., day, week, month, and year) as search keys (search parameters).

In response to the acquisition request, the search part **542** of the history information management server **540** searches the process history storage part **547** for the process history information corresponding to the acquisition request extracting the corresponding process history information (step S**22**). Specifically, the search part **542** initially computes an acquisition target range (from_date, to_date) from the acquisition target period. For example, when the acquisition target period is "2010-09", the acquisition target range is from 0 am, Sep. 1, 2010 to 12 pm, Sep. 30, 2010 (i.e., 0 am, Oct. 1, 2010). Hence, the acquisition target range is "from_date"=2010-09-01 00:00:00, "to_date"=2010-10-01 00:00:00. Next, the search part **542** searches the attendee history management table (t**1**) for process history information (i**1**) corresponding to the terminal ID, "from_date", and "to_date" based on the search requirements (A, B, C, and D) illustrated in FIG. **15**B to extract the corresponding process history information (i**1**). Next, the search part **542** searches the conference history management table (t**2**) for process history information (i**2**) corresponding to a conference ID in the extracted process history information (i**1**) as a search key to extract the corresponding process history information (i**2**). Subsequently, the search part **542** merges the extracted process history information (i**1**) and the process history information (i**2**) to create process history information (I) to provide the request source terminal with the created process history (I). Further, when there are two or more sets of process history information (I), the search part **542** merges the two or more sets of process history information (I) to create a process history information group (IG).

In the following, a description is given of a search method employed in the above search requirements (A, B, C, and D). The present embodiment enables the transmission management system **50** to carry out a process to provide history information even when a range from the attending date to the exit date may be several months. For example, when there is history information indicating that the user terminal **10** attended a conference on "2010-08-30" (Aug. 30, 2010) and exited the conference on "2010-10-01" (Oct. 1, 2010), the transmission management system **50** may carry out a process to provide process history information of any of months including August, September, and October. That is, the terminal IDs each having a period from the attending date to the exit date that matches the period from "from_date" to "to_date" may be extracting targets among the terminal IDs. In FIG. **15**A, all the raw history information sets L**1** to L**6** may be extracting targets. More specifically, the extracting targets may be classified by four cases corresponding to the search requirements (A, B, C, and D) illustrated in FIG. **15**B. With the above-described classification of the target requirements, the search range may be limited by each of the search requirements. Thereafter, desired raw history information may be extracted in a fewer search hours by integrating the search requirements with logical "OR". Note that the search requirements illustrated in FIG. **15**B represent the following cases.

(1) Search requirement A: a case where the attending date of the conference falls within the acquisition target month. The search range of the attending dates may be limited to the acquisition request target month.

(2) Search requirement B: a case where the exit date of the conference falls within the acquisition target month. The search range of the exit dates may be limited to the acquisition request target month.

(3) Search requirement C: a case where the user terminal **10** attends the conference before the acquisition request target month, and is still attending the conference. The search range of the exit dates may be limited to "the conference in progress". Further, only one raw history information indicating the "conference in progress" may be included in the specific terminal **10** unless the terminal **10** attends another conference differing from the currently attended conference.

(4) Search requirement D: a case where the period from the attending date to the exit date includes several months. The raw history information to be searched for may be limited based on the requirement indicating the "attending hours being (to_date-from_date) or above" (i.e., one month or above in this case).

Note that this embodiment illustrates an example in which the raw history information may be extracted when the acquisition request target period is monthly (e.g., "2010-09"). However, the raw history information may be extracted by the same search method when the acquisition request target period is daily period (e.g., "2010-09"), yearly (e.g., "2010"), or any specified period (e.g., "2010-09 00:00:00" to "2010-09 12:00:00:00"). Further, FIG. **15**B illustrates an example in which raw history information is searched for by a terminal ID of a certain acquisition request source terminal. However, the raw history information may be searched for by terminal IDs of two or more acquisition request source terminals. Alternatively, the raw history information may be searched for by parameters other than the terminal ID of the acquisition request source terminal or the acquisition target period.

Next, illustration is given of a case where the transmission management system **50** provides the acquisition request source terminal with a process history information group (IG).

Subsequently, the deficiency history excluding part **543** determines whether the process history information group (IG) includes process history information (I) having deficiency (E) (step S**23**). In step S**23**, the deficiency history excluding part **543** determines that the process history information group (IG) includes the process history information (I) having deficiency (E) ("YES" in step S**23**), and the deficiency history excluding part **543** excludes the process history information (I) having the deficiency (E) alone (step S**24**). Hence, the transmission management system **50** may be able to prevent the acquisition request source terminal from being provided with the process history information having deficiency.

Note that in the present embodiment, the raw history information is transmitted from each of the user terminals **10** in the order of communications statuses "invite", "start", "join", "leave", and "end". Hence, the deficiency history excluding part **543** refers to items of the "organizer terminal ID", "start date and time", "attending date and time", "exit date and time", and "end date and time" equating with the

communications statuses in a reverse order of a transmitting order of these items. Then, when there is an item having no communications status before the item having the communications status, the deficiency history excluding part **543** determines that the process history information includes deficiency (E). The rule indicating the above-described determination may be represented by an electronic file managed outside the deficiency history excluding part **543**.

Next, after step S**24** or when the deficiency history excluding part **543** determines that there is no deficiency in step S**23** ("NO" in step S**23**), the transmitting-receiving part **541** of the history management server **540** transmits the process history information group (IG) to the terminal setting utility server **550**, and the transmitting-receiving part **551** of the terminal setting utility server **550** transmits the received process history information group (IG) to the acquisition request source terminal (step S**25**).

On the other hand, with respect to the above step S**25**, a browser function of the external input apparatus **40** displays a "communications terminal setting utility" screen **1000** illustrated in FIG. **16** on the display **208** of the external input apparatus **40** connected to the acquisition request source terminal. The communications terminal setting utility screen **1001** displays the terminal ID 110001 of the user terminal **10**, the period **1002** of the history relating to the communications indicated in the process history information, an acquisition target period switching menu **1003** of the acquisition requested process history information, the process history information group (IG) **1004**, and the like.

Specifically, in an example of the screen illustrated in FIG. **16**, the external input apparatus **40** logs into the terminal setting utility server **550** with the terminal ID of the acquisition request source terminal is "110001". When the user requests acquiring the process history information, the user selects "September, 2010" from the acquisition target period switching menu **1003**. Hence, the external input apparatus **40** causes the acquisition request source terminal to request the transmission management system **50** to acquire the process history information based on the requirement of the terminal ID "1100001", and the acquisition target period "2010-09". Accordingly, the external input apparatus **40** causes the display **208** of the external input apparatus **40** to display the screen **1001** illustrated in FIG. **16** based on the process history information group (IG) transmitted from the transmission management system **50** via the request source terminal.

Further, the acquisition of the process history information may be requested based on the changed acquisition target period every time the acquisition target period switching menu **1003** is selectively switched, or every time one of triangular buttons displayed on the opposite sides of the acquisition target period switching menu **1003** is pressed.

Note that when the conference history relating to the process history information is recorded over several months, the conference history is displayed as follows. The following three cases are illustrated when the attending date and time are "2010-08/30 22:00:00" (Aug. 30, 2010), and the exit date and time are "2010-10-01 10:00:00" (Oct. 1, 2010).

(1) A case where the communications histories are displayed as they are.

(1-1) the communications history in August is displayed as the attending date and time "2010-08-30 22:00:00", and the exit date and time "2010-10-01 10:00:00".

(1-2) the communications history in September is displayed as the attending date and time "2010-08-30 22:00:00", and the exit date and time "2010-10-01 10:00:00".

(1-3) the communications history in October is displayed as the attending date and time "2010-08-30 22:00:00", and the exit date and time "2010-10-01 10:00:00".

(2) A case where all the attending dates and times and the exit dates and times are displayed, but those at the boundary between the two months are trimmed (deleted). Note that the trimming process may be carried out by the auxiliary function part **552** of the terminal setting utility server **550**, or the search part **542** of the history management server **540**.

(2-1) the communication history in August is displayed as the attending date and time "2010-08-30 22:00:00", and the exit date and time "2010-08-31 23:59:59".

(2-2) the communication history in August is displayed as the attending date and time "2010-09-01 00:00:00", and the exit date and time "2010-09-30 23:59:59".

(2-3) the communication history in October is displayed as the attending date and time "2010-10-01 00:00:00", and the exit date and time "2010-10-01 10:00:00".

(3) A case where the attending dates and times and the exit dates and times bridging the two months are trimmed such that the attending dates and times and the exit dates and times are not displayed (i.e., the attending dates and times and the exit dates and times at the boundary between the two months are displayed as "<--", "-->").

Note that the trimming process may be carried out by the auxiliary function part **552** of the terminal setting utility server **550**, or the search part **542** of the history management server **540**.

(3-1) the communication history in August is displayed as the attending date and time "2010-08-30 22:00:00", and the exit date and time "-->".

(3-2) the communication history in September is displayed as the attending date and time "<--", and the exit date and time "-->".

(3-3) the communication history in October is displayed as the attending date and time "2010-08-30 22:00:00", and the exit date and time "2010-10-01 10:00:00".

Since the communication log transmission side does not have to wait for the end of a log forming process by receiving the transmission of the communication log as a message queue (messaging system of asynchronous communications), the primary process including the communication control will not be adversely affected.

Next, a description is given, with reference to FIGS. **11**, **17** and **18**, of a process in which the administrator of the transmission management system **1** charges the users of the transmission management system **1** the attending fee resulting from the user attending the teleconference. FIG. **17** is a sequence diagram illustrating a fee charge method. FIG. **18** is a schematic diagram illustrating a summary of attending fees.

Note that the user (or user unit) in FIG. **18** does not indicate a unit per user of the terminal **10** but indicates a unit per user who pays the attending fee. The example in FIG. **1** assumes a case in which the four offices of a Tokyo office, an Osaka office, a New York office, and a Washington, D.C. office separately pay the attending fees.

Initially, the transmission management system **50** transmits each terminal ID and corresponding charge history information (i) to the fee management system **60** via the dedicated line **2***x*(step S**31**). Then, the fee management system **60** receives the charge history information (i) for each of the terminals **10**. Specifically, in the fee computing server **620** of the fee management system **60**, the transmitting-receiving part **621** receives each of the terminal IDs and corresponding charge history information (i) from the pro-

cess history storage part **547** of the history information management server **540** in the transmission management system **50** via the transmitting-receiving part **541**, the LAN **590**, the transmitting-receiving part **571**, the dedicated line **2***x*, the transmitting-receiving part **612**, the LAN **690**, and the transmitting-receiving part **621** in sequence. Note that the fee management system **60** side may request the transmission management system **50** to transmit the charge history information (i), or the transmission management system **50** may regularly (e.g., the first of each month) transmit the charge history information (i) to the fee management system **60**. Note that as described above, the charge history information (i) includes attending hours information (pi) and conversation quality information (si).

Subsequently, the attending hours computing part **622***a* sums up each of the attending hours values represented by the "attending hours" of a corresponding one of terminal IDs based on the attending hours information (pi) of a predetermined period (e.g., one day period) acquired from the history information management server **540** to compute total attending hours for each of the terminals **10** within the predetermined period (step S**32**).

Then, the conversation quality computing part **622***b* acquires each of the conversation quality values represented by the "conversation quality" of a corresponding one of terminal IDs based on the conversation quality information (si) of a predetermined period (e.g., one day period) acquired from the history information management server **540**. The conversation quality computing part **622***b* then computes the average of the conversation quality values per unit time as an average conversation quality per unit time within the predetermined period (step S**33**).

Next, the attending fee computing part **622***c* computes an attending fee for each of the terminals **10** within the predetermined period based on the total attending hours computed in step S**32** and the average conversation quality per unit time computed in step S**33** (step S**34**).

For example, there is a case where the administrator determines an attending fee per minute being ten yen in advance. In this case, when the total attending hours of any one of the terminals **10** computed by the attending hours computing part **622***a* is 160 min, and the average conversation quality per unit time is 91, the attending fee may be computed as follows: 10×160×0.91=1456 yen.

Subsequently, the attending fee summing part **622***d* of the computing part **622** refers to the user management table (Ty) (see FIG. **12**) managed by the user management part **629**, and computes a total attending fee for each of the users by summing the attending fees (computed in step S**34**) of the terminals **10** represented by a corresponding one of the user IDs serving as charging destinations of the attending fees (step S**35**).

For example, in FIG. **12**, the terminal IDs corresponding to the user ID "a123" are "11001", "11002", "11003", and the like. Hence, the total attending fee of the user represented by the user ID "a123" may be computed by summing the attending fees of the terminals **10** represented by "11001", "11002", "11003", and the like computed in step S**32**.

Thus, the fee management system **60** may be able to compute the total attending fee for each of the users as illustrated in FIG. **18**.

Next, the charge part **623** of the fee management system **60** refers to the user management table (Ty) illustrated in FIG. **12**, and transmits the attending fee charging information via electronic mail to the user terminal **20** having the user mail address serving as an attending fee reporting destination (step S**36**). The attending fee charging information includes the total attending fee for each of the users illustrated in FIG. **18** such that each user may be able to acknowledge the total attending fee that he or she is obliged to pay.

Main Effects of Embodiments

As described above, the embodiments of the present invention may compute the total attending fee for each of the users attending the conversation (conference) based on the total attending hours and the conversation quality. Hence, the administrator of the transmission system **1** may be able to charge the attending fee by hours of the user attending the conversation in the conference and by conversation quality while the user having conversations (communication) in conference. Accordingly, the embodiments of the present invention may be able to provide advantageous effects of charging the users the fees in a fair manner.

Note that the conversation quality may be greatly affected by the network circuitry quality. The degradation of the network circuitry may result in sound interruption, image skipping, or the like. However, the conversation quality is not limited to that determined based on the network circuitry quality alone. That is, the conversation quality indicates the quality of the conversation that the user has eventually received via the terminal **10** side regardless of the causes of the conversation quality degradation. Hence, when the conversation quality is degraded (low) due to the delay or the deficiency of the various servers managed by the administrator, the attending fee to be charged is determined based on such low quality conversation quality. In this method, the fees may be charged in a fairer manner between users.

Further, the transmission management system **50** creates the process history information and stores the created process history information prior to receiving from each of the terminals **10** the acquisition request for acquiring the process history information relating to the communications in the corresponding terminal **10**. Hence, the transmission management system **50** may be able to rapidly provide the acquisition request source terminal **10** with the process history information when receiving the acquisition request for acquiring the process history information from each of the terminals **10**.

Moreover, the conversation session seim may be continued by bridging the two months (e.g., bridging August and September, or bridging September and October). In such a case, even if the process history information of September alone is requested by the user, the transmission management system **50** may be unable to acquire the raw history information having the communication status being "join" or "leave" within September by searching for the raw history information having such a communication status being "join" or "leave" within September alone. Hence, the transmission management system **50** initially searches for the raw history information sets having the communication status being "join" indicating that the communications have been initiated before September, and further specifies one of the raw history information sets based on a predetermined conference ID(x). Subsequently, the transmission management system **50** initially searches for the raw history information sets having the communication status being "leave" indicating that the communications have been finished before September, and further specifies one of the raw history information sets based on a conference ID identical to the above-described predetermined conference ID(x). Accordingly, the transmission management system **50** may need a long time to search for the corresponding raw history information to create process history information. However,

in this embodiment, the search time may be reduced by employing the search method illustrated in FIGS. **15**A and **15**B, and hence, the process history information may be created rapidly.

Other Embodiments

The process part **532** may add a "deficiency flag" to the attributes of the attendee history management table (t**1**) illustrated in FIG. **10**A to create an attendee history management table (t**11**) illustrated in FIG. **19**A. Likewise, the process part **532** may add a "deficiency flag" to the attributes of the conference history management table (t**2**) illustrated in FIG. **10**B to create a conference history management table (t**12**) illustrated in FIG. **19**B. In such a case, the deficiency history excluding part **543** illustrated in FIG. **7** may determine whether there is deficiency (E) in the process history information stored in the process history storage part **547** prior to receiving the acquisition request for acquiring process history information from the terminal **10**. When the deficiency history excluding part **543** determines that there is no deficiency (E) in the process history information, the deficiency history excluding part **543** inputs "0" as search result information to the attribute of the "deficiency flag" of each record illustrated in FIGS. **19**A and **19**B. On the other hand, when the deficiency history excluding part **543** determines that there is deficiency (E) in the process history information, the deficiency history excluding part **543** inputs "1" as the search result information into the attribute of the "deficiency flag". Accordingly, the communication management server **510** may be able to receive the process history information sets from the history management server **540** by excluding the process history information having the "deficiency flag" being "1". Further, it may be unnecessary for the deficiency history excluding part **543** to determine whether there is deficiency in the process history information after receiving the acquisition request for acquiring the process history information from the acquisition request source terminal. Hence, the acquisition request source terminal may be able to acquire the process history information rapidly. Note that in the above example, "0" indicates normal, and "1" indicates deficiency (abnormal); however, the normal and deficiency may be indicated by any representations such as "true" and "false", or "normal" and "deficiency" insofar as whether the process history information includes deficiency or not is clarified by such representations.

Further, the history information management server **540** may include a plurality of combinations each including the temporary storage part **529**, the process part **532**, and the process history storage part **547** illustrated in FIG. **7**, and plural types of process history information may be created from one raw history information set by sequentially transferring the raw history information, the process history information, and the like with a message relay to various temporary storage parts **529**.

Further, in the transmission management system **50**, the communication management server **510**, the temporary storage server **520**, the plural process servers **530**, the history management server **540**, and the terminal setting utility server **550** are illustrated as separate servers; however, the transmission management system **50** is not limited to the configuration having the separate servers. The transmission management system **50** may include any one or more integrated functions of the above servers.

Further, each of the relay device **30**, the external input apparatus **40**, the transmission management system **50**, the fee management system **60**, the program providing system **90**, and the maintenance system **100** may be composed of a single computer, or plural computers to which any functions of the above components are allocated. Further, when the program providing system **90** is composed of a single computer, the program transmitted by the program providing system **90** may be transmitted by being divided into plural modules or without being divided. In addition, when the program providing system **90** is composed of plural computers, the divided modules of the program may be transmitted from separate computers.

Moreover, a recording medium integrally storing or different recording media separately storing respective programs of the relay device **30**, the external input apparatus **40**, the transmission management system **50**, the fee management system **60**, the program providing system **90**, and the maintenance system **100**; the hard disk (HD) **204** integrally storing or separately storing the respective programs; and the program providing system **90** having the HD **204** may be used when domestically or internationally providing the users with the programs as a program product.

Further, an example of the transmission system **1** is illustrated as a teleconference system in the above embodiments. However, the example of the transmission system **1** is not limited to the teleconference system, and may be a telephone system such as an internet protocol (IP) phone or an Internet phone. Alternatively, the transmission system **1** may be a car navigation system. In such a case, one of terminals **10** corresponds to a car navigation apparatus installed in a vehicle, and the other one of the terminals **10** corresponds to a management terminal or a management server in a management center of the car navigation, or another car navigation apparatus installed in another vehicle. Further, a history relating to calls in a certain period may be a communications history or a call history of a mobile phone.

The embodiments of the present invention may provide the fee management system, the transmission system, and the non-transitory recording medium storing the fee management program, which may be able to charge the users fees in a fair manner.

Note that components, or any combinations of expressions or the components of the present invention that are applied to a method, an apparatus, a system, a computer program, a recording medium, and the like may be effective as aspects of the invention.

The present invention can be implemented in any convenient form, for example using dedicated hardware, or a mixture of dedicated hardware and software. The present invention may be implemented as computer software implemented by one or more networked processing apparatuses. The network can comprise any conventional terrestrial or wireless communications network, such as the Internet. The processing apparatuses can compromise any suitably programmed apparatuses such as a general purpose computer, a personal digital assistant, a mobile telephone (such as a WAP or 3G-compliant phone) and so on. Since the present invention can be implemented as software, each and every aspect of the present invention thus encompasses computer software implementable on a programmable device. The computer software can be provided to the programmable device using any storage medium for storing processor readable code such as a floppy disk, a hard disk, a CD ROM, a magnetic tape device or a solid state memory device.

The hardware platform includes any desired kind of hardware resources including, for example, a central processing unit (CPU), a random access memory (RAM), and a hard disk drive (HDD). The CPU may be implemented by any desired kind of and any desired number of processors.

The RAM may be implemented by any desired kind of volatile or non-volatile memory. The HDD may be implemented by any desired kind of non-volatile memory capable of storing a large amount of data. The hardware resources may additionally include an input device, an output device, or a network device, depending on the type of the apparatus. Alternatively, the HDD may be provided outside of the apparatus as long as the HDD is accessible. In this example, the CPU, such as cache memory of the CPU, and the RAM may function as a physical memory or a primary memory of the apparatus, while the HDD may function as a secondary memory of the apparatus.

All examples and conditional language recited herein are intended for pedagogical purposes to aid the reader in understanding the principles of the invention and the concepts contributed by the inventor to furthering the art, and are to be construed as being without limitation to such specifically recited examples and conditions, nor does the organization of such examples in the specification relate to a showing of the superiority or inferiority of the invention. Although the embodiment of the present invention has been described in detail, it should be understood that various changes, substitutions, and alterations could be made hereto without departing from the spirit and scope of the invention.

The present application is based on and claims the benefit of priority of Japanese Priority Application No. 2013-038766 filed on Feb. 28, 2013, the entire contents of which are hereby incorporated by reference.

What is claimed is:

1. A transmission management system, comprising:

a plurality of transmission terminals configured to mutually transmit information associated with a video conference conversation between the plurality of transmission terminals, wherein the plurality of transmission terminals comprise conversation quality determining units configured to determine actual conversation quality information indicating actual conversation communication service quality of audio and video provided during the video conference conversation with respect to a predetermined standard of conversation communication service quality, wherein the actual conversation quality information is based in part on an amount of sound interruption, an amount of image skipping and an average actual image resolution achieved during the video conference conversation, wherein the average actual image resolution is determined based on received pixel information; and

a fee management system configured to manage attending fees that are charged when the plurality of transmission terminals attend the video conference conversation, wherein the fee management system includes:

a receiver configured to receive attending hours information and the actual conversation quality information, the attending hours information indicating attending hours for which each of the transmission terminals attended the video conference conversation; and

processing circuitry configured to:

compute total attending hours based on the attending hours information, the total attending hours indicating hours for which the respective terminals attended the conversation, and

compute an attending fee for each of the terminals based on the corresponding total attending hours and the actual conversation quality information.

2. The transmission management system as claimed in claim **1**, wherein the processing circuitry is further configured to:

compute an average conversation quality of the video conference conversation attended by the terminals based on the actual conversation quality information, and

compute the attending fee for each of the terminals based on the corresponding total attending hours and the computed average conversation quality of the terminal.

3. The transmission management system as claimed in claim **1**, wherein the processing circuitry is further configured to

manage user identification information for identifying a user of each of the terminals and terminal identification information for identifying the terminal used by the user by associating the user identification information with the terminal identification information, and

compute the total attending fee of the user by summing the attending fee of each of the terminals represented by the user identification information, for each of the users.

4. The transmission management system as claimed in claim **3**, wherein the processing circuitry is further configured to:

transmit an electronic mail for charging the total attending fee to an electronic mail address corresponding to the user identification information of the user who is charged for the total attending fee, and

manage the electronic mail address of the user represented by the user identification information, for each of the users.

5. A transmission management method, comprising:

transmitting, by a plurality of transmission terminals, information associated with a video conference conversation between the plurality of transmission terminals,

determining, by conversation quality determining units in the plurality of transmission terminals, actual conversation quality information indicating actual conversation communication service quality of audio and video provided during the video conference conversation with respect to a predetermined standard of conversation communication service quality, wherein the actual conversation quality information is based in part on an amount of sound interruption, an amount of image skipping and an average actual image resolution achieved during the video conference conversation, wherein the average actual image resolution is determined based on received pixel information;

managing, by a fee management system, attending fees that are charged when the plurality of transmission terminals attend the video conference conversation;

receiving, by a receiver of the fee management system, attending hours information and the actual conversation quality information, the attending hours information indicating attending hours for which each of the transmission terminals attended the video conference conversation;

computing, by processing circuitry of the fee management system, total attending hours based on the attending hours information, the total attending hours indicating hours for which the respective terminals attended the conversation; and

computing, by the processing circuitry of the fee management system, an attending fee for each of the terminals based on the corresponding total attending hours and the actual conversation quality information.

6. The transmission management method as claimed in claim 5, further comprising:

computing an average conversation quality of the video conference conversation attended by the terminals based on the actual conversation quality information; and

computing the attending fee for each of the terminals based on the corresponding total attending hours and the computed average conversation quality of the terminal.

7. The transmission management method as claimed in claim 5, further comprising:

managing user identification information for identifying a user of each of the terminals and terminal identification information for identifying the terminal used by the user by associating the user identification information with the terminal identification information; and

computing the total attending fee of the user by summing the attending fee of each of the terminals represented by the user identification information, for each of the users.

8. The transmission management method as claimed in claim 7, further comprising:

managing an electronic mail address of the user represented by the user identification information, the electronic mail address being managed for each of the users; and

transmitting an electronic mail for charging the total attending fee to the electronic mail address corresponding to the user identification information of the user who is charged for the total attending fee.

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